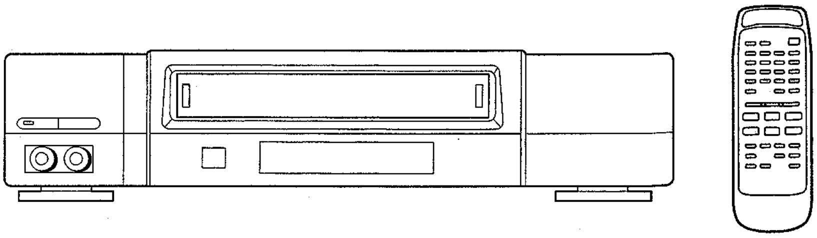
SERVICE DATA
FILE NO. 784 - 045
SUPPLEMENT-B

TOSHIBA
COLOR VIDEO CASSETTE RECORDER
V-403T/413G



V-403T

Note:

This model is based on V-312T/312G/322GS. For more informations, please refer to Service Data V-312T/312G/322GS (File No. 780-045).
For the information of power supply circuit, please refer to Service Data (File No. 784-047).

SPECIFICATIONS

GENERAL

Video recording system:	Head configuration 2-head rotary
Video signal:	CCIR standard, PAL color
Storage temperature:	–20° to +60°C (–4° to 140°F)
Operating temperature:	5° to 40°C (41° to 104°F)
Antenna:	75-ohms coaxial
Channel coverage:	

	PAL B/G, SECAM B/G
VHF	E2 – E12
UHF	E12 – E69
CATV	X – Z, S01 – S41

AERIAL output signal:	UHF channel 55 – 66 (variable)
Power requirement:	AC 220 – 240V, 50Hz
Power consumption:	25W
Weight:	5.6kg
Dimensions:	398 (W) X 94 (H) X 331 (D) mm

VIDEO

Input:	VIDEO LINE IN: AV socket, 1.0V (p-p), 75-ohms VIDEO phono type jack (front), 1.0V (p-p), 75-ohms
Output:	VIDEO LINE OUT: AV socket, 1.0V (p-p),75-ohms
Signal-to-noise ratio:	Better than 43 dB (SP mode)

AUDIO

Input:	AUDIO LINE IN: AV socket, –3.8 dBm AUDIO phono type jack (front), – 3.8 dBm, 47 k-ohms
Output:	AUDIO LINE OUT: AV socket, –3.8 dBm
Frequency response:	80Hz to 10kHz (SP mode)
Signal-to-noise-ratio:	Better than 42 dB (SP mode)

TAPE TRANSPORT

Tape speed:	23.39 mm/sec. (SP mode), 11.7 mm/sec. (LP mode)
Maximum recording-time:	SP mode: 4 hours (E-240), LP mode: 8 hours (E-240)
Winding time:	Within 2 min. (E-180)

TIMER

Clock:	24 hour display, quartz control
No. of events:	8 over 1 year

Caution: Copyright Act 1956 Users of video recording equipment should note that it may be unlawful to record television broadcasts, cinematograph films or video recording without the permission of the relevant copyright owner.

Design and specifications are subject to change without notice.

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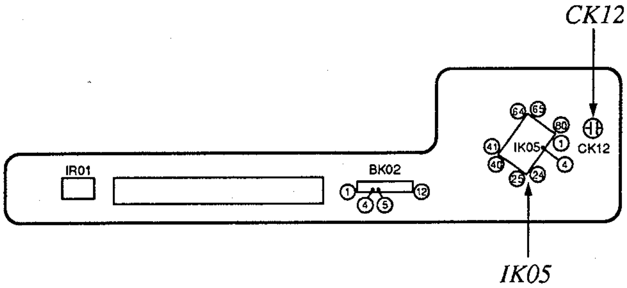
1. ELECTRICAL ADJUSTMENT

For other adjustments, please refer to Service Data V-312T/312G/322GS (File No. 780-045).

1-1. Timer Circuit


CK12
IR01
BK02
①
⑫
④⑤
IK05
CK12
IK05

Timer PC Board

1-1-1. Clock Frequency

Test point: Pin 4 of IK05
Test equipment: Frequency counter
Adjusting point: CK12

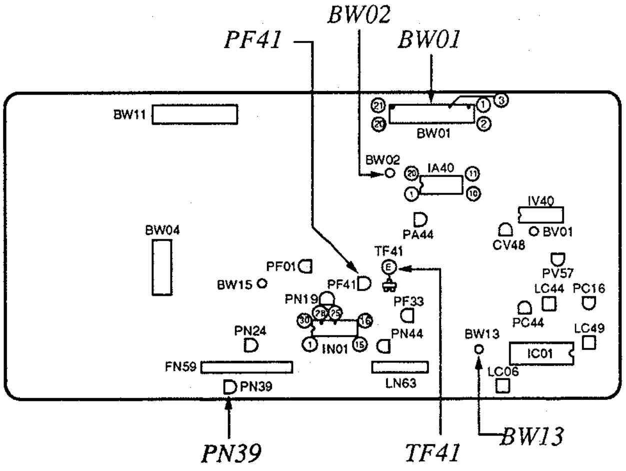
1. Connect an oscilloscope to pin 4 of IK05.
2. Connect 5V DC voltage to pins 4 and 5 of BK02.

Note:

- Correct adjustment is only possible with high impedance probe 50 : 1 or active probe.
- Probe capacitance must be less than 2.5pF.

3. Adjust CK12 for 8192 ± 0.05 Hz.

1-2. Video Circuit


BW02
PF41
BW01
BW11
BW01
BW02
IA40
IV40
BW04
PA44
BV01
CV48
PF01
TF41
PV57
BW15
PF41
LC44
PC16
PN19
PF33
PC44
PN24
PN44
BW13
LC49
IN01
IC01
FN59
LN63
LC06
PN39
PN39
TF41
BW13

Main PC Board

1-2-1. EE Level

Test point: Pin 20 of BW01, BW02
Test equipment: Oscilloscope
Adjusting point: PN39

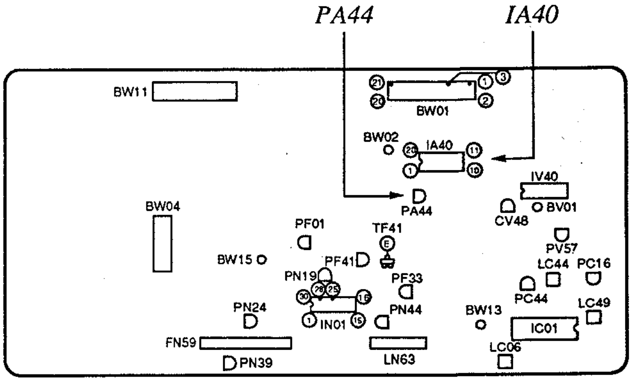
1. Feed the color bar signal (PAL) to the line input terminal and set the VTR to EE mode.
2. Connect an oscilloscope to BW02 and trigger the scope with composite sync signal at BW13. Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust PN39 so that amplitude of 2.0 ± 0.1Vp-p is obtained.
4. Apply color bar signal (PAL) to pin 20 of BW01.
5. Confirm that the burst amplitude is 580 ± 40mVp-p.

1-2-2. REC FM Current

Test point: TF41 emitter
Test equipment: Oscilloscope
Adjusting point: PF41

1. Feed the PAL color bar signal to the line input terminal and set the VTR to REC mode.
2. Connect the oscilloscope to TF41 emitter and trigger the scope with composite sync signal at BW13. Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust PF41 so that the amplitude of "Black level" portion shows 640 ± 30 mVp-p.

1-3. OSD Circuit

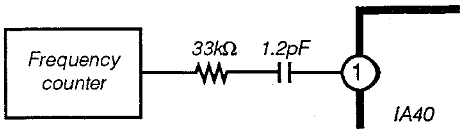

PA44
IA40
BW11
BW01
BW02
IA40
IV40
BW04
PA44
BV01
CV48
PF01
TF41
PV57
BW15
PF41
LC44
PC16
PN19
PF33
PC44
PN24
PN44
BW13
LC49
IN01
IC01
FN59
LN63
LC06
PN39

Main PC Board

1-3-1. Character Oscillator

Test point: Pin 1 of IA40
Test equipment: Frequency counter
Adjusting point: PA44

1. Connect a frequency counter via a R/C series circuit (R = 33 kΩ, C = 1.2 pF) at pin 1 of IA40.
2. Adjust PA44 for 7.6 MHz ± 40 kHz.


Frequency counter
33kΩ
1.2pF
1
IA40

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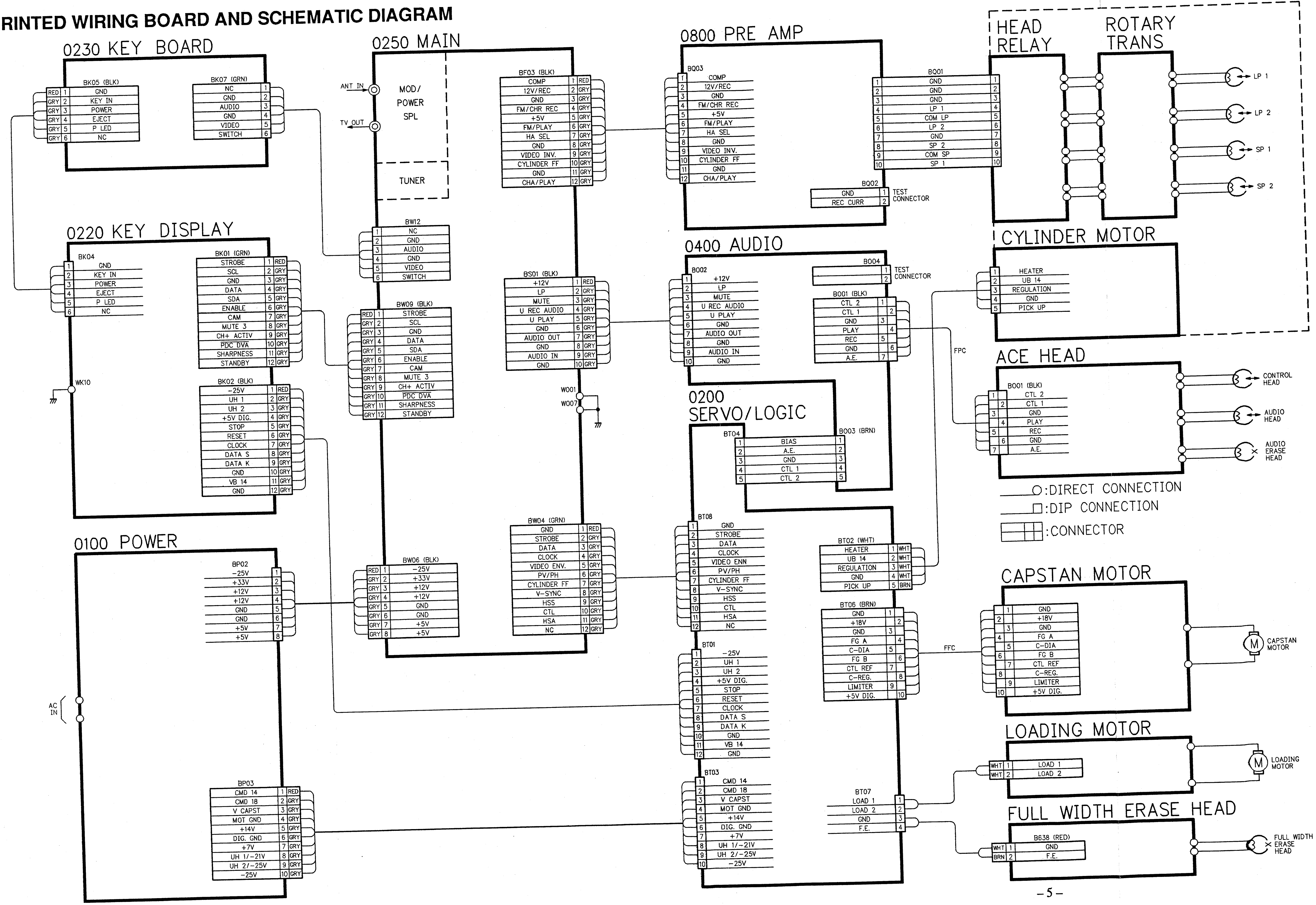
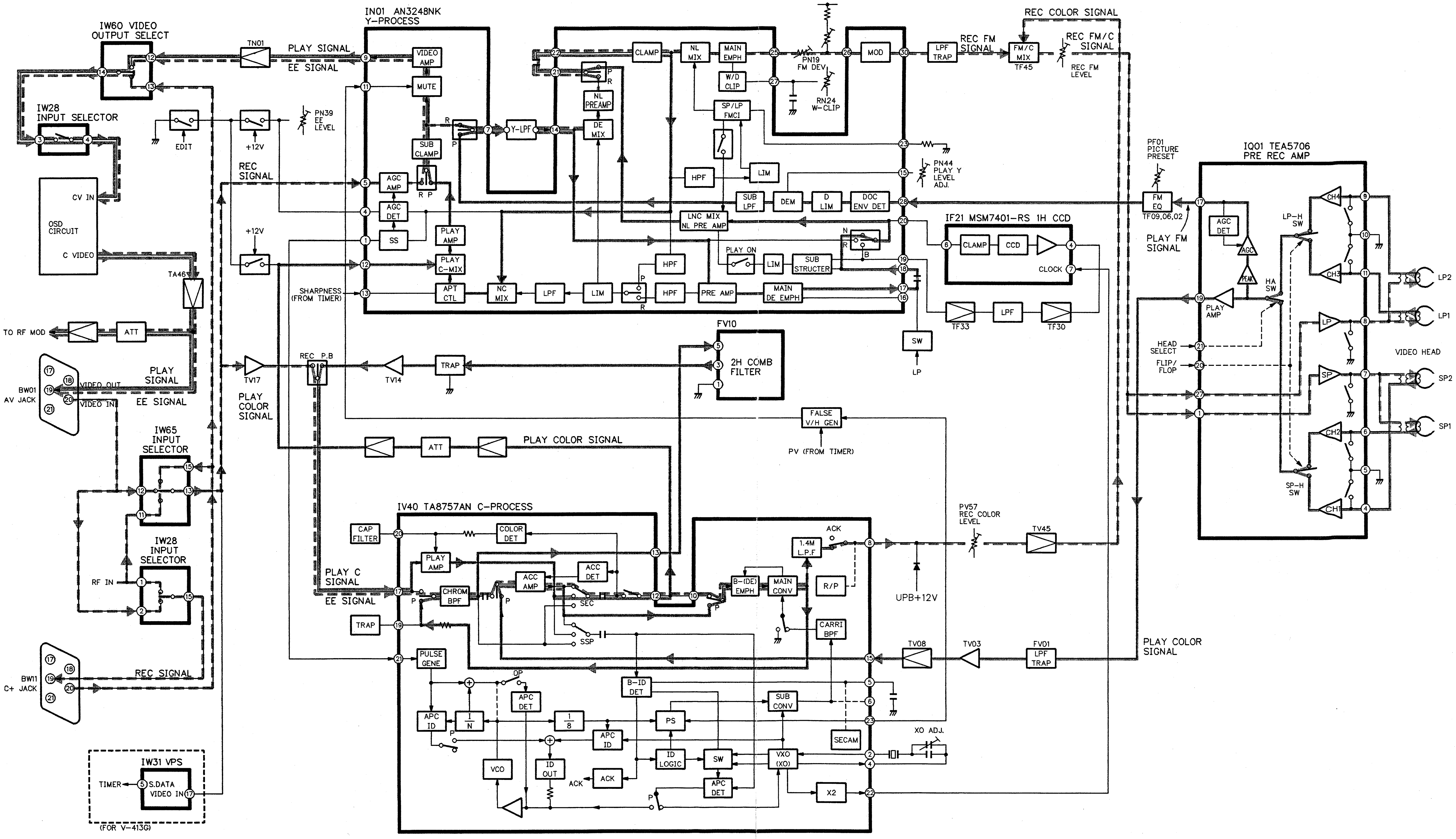
2. PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM


0230 KEY BOARD
BK05 (BLK)
RED 1 GND
GRY 2 KEY IN
GRY 3 POWER
GRY 4 EJECT
GRY 5 P LED
GRY 6 NC
BK07 (GRN)
NC 1
GND 2
AUDIO 3
GND 4
VIDEO 5
SWITCH 6
0220 KEY DISPLAY
BK04
1 GND
2 KEY IN
3 POWER
4 EJECT
5 P LED
6 NC
BK01 (GRN)
STROBE 1 RED
SCL 2 GRY
GND 3 GRY
DATA 4 GRY
SDA 5 GRY
ENABLE 6 GRY
CAM 7 GRY
MUTE 3 8 GRY
CH+ ACTIV 9 GRY
PDC DVA 10 GRY
SHARPNESS 11 GRY
STANDBY 12 GRY
WK10
BK02 (BLK)
-25V 1 RED
UH 1 2 GRY
UH 2 3 GRY
+5V DIG. 4 GRY
STOP 5 GRY
RESET 6 GRY
CLOCK 7 GRY
DATA S 8 GRY
DATA K 9 GRY
GND 10 GRY
VB 14 11 GRY
GND 12 GRY
0100 POWER
BP02
-25V 1
+33V 2
+12V 3
+12V 4
GND 5
GND 6
+5V 7
+5V 8
AC IN
BP03
CMD 14 1 RED
CMD 18 2 GRY
V CAPST 3 GRY
MOT GND 4 GRY
+14V 5 GRY
DIG. GND 6 GRY
+7V 7 GRY
UH 1/-21V 8 GRY
UH 2/-25V 9 GRY
-25V 10 GRY
0250 MAIN
ANT IN
TV OUT
MOD/ POWER SPL
TUNER
BF03 (BLK)
COMP 1 RED
12V/REC 2 GRY
GND 3 GRY
FM/CHR REC 4 GRY
+5V 5 GRY
FM/PLAY 6 GRY
HA SEL 7 GRY
GND 8 GRY
VIDEO INV. 9 GRY
CYLINDER FF 10 GRY
GND 11 GRY
CHA/PLAY 12 GRY
BW12
1 NC
2 GND
3 AUDIO
4 GND
5 VIDEO
6 SWITCH
BW09 (BLK)
RED 1 STROBE
GRY 2 SCL
GRY 3 GND
GRY 4 DATA
GRY 5 SDA
GRY 6 ENABLE
GRY 7 CAM
GRY 8 MUTE 3
GRY 9 CH+ ACTIV
GRY 10 PDC DVA
GRY 11 SHARPNESS
GRY 12 STANDBY
BS01 (BLK)
+12V 1 RED
LP 2 GRY
MUTE 3 GRY
U REC AUDIO 4 GRY
U PLAY 5 GRY
GND 6 GRY
AUDIO OUT 7 GRY
GND 8 GRY
AUDIO IN 9 GRY
GND 10 GRY
W001
W007
BW06 (BLK)
RED 1 -25V
GRY 2 +33V
GRY 3 +12V
GRY 4 +12V
GRY 5 GND
GRY 6 GND
GRY 7 +5V
GRY 8 +5V
BW04 (GRN)
GND 1 RED
STROBE 2 GRY
DATA 3 GRY
CLOCK 4 GRY
VIDEO ENV. 5 GRY
PV/PH 6 GRY
CYLINDER FF 7 GRY
V-SYNC 8 GRY
HSS 9 GRY
CTL 10 GRY
HSA 11 GRY
NC 12 GRY
0800 PRE AMP
BQ03
1 COMP
2 12V/REC
3 GND
4 FM/CHR REC
5 +5V
6 FM/PLAY
7 HA SEL
8 GND
9 VIDEO INV.
10 CYLINDER FF
11 GND
12 CHA/PLAY
BQ01
1 GND 1
2 GND 2
3 GND 3
4 LP 1 4
5 COM LP 5
6 LP 2 6
7 GND 7
8 SP 2 8
9 COM SP 9
10 SP 1 10
BQ02
GND 1
REC CURR 2
TEST CONNECTOR
HEAD RELAY
ROTARY TRANS
LP 1
LP 2
SP 1
SP 2
0400 AUDIO
B002
1 +12V
2 LP
3 MUTE
4 U REC AUDIO
5 U PLAY
6 GND
7 AUDIO OUT
8 GND
9 AUDIO IN
10 GND
B004
1
2
TEST CONNECTOR
B001 (BLK)
CTL 2 1
CTL 1 2
GND 3
PLAY 4
REC 5
GND 6
A.E. 7
FPC
CYLINDER MOTOR
1 HEATER
2 UB 14
3 REGULATION
4 GND
5 PICK UP
ACE HEAD
B001 (BLK)
1 CTL 2
2 CTL 1
3 GND
4 PLAY
5 REC
6 GND
7 A.E.
CONTROL HEAD
AUDIO HEAD
AUDIO ERASE HEAD
0200 SERVO/LOGIC
BT04
1 BIAS
2 A.E.
3 GND
4 CTL 1
5 CTL 2
B003 (BRN)
1
2
3
4
5
BT08
1 GND
2 STROBE
3 DATA
4 CLOCK
5 VIDEO ENN
6 PV/PH
7 CYLINDER FF
8 V-SYNC
9 HSS
10 CTL
11 HSA
12 NC
BT02 (WHT)
HEATER 1 WHT
UB 14 2 WHT
REGULATION 3 WHT
GND 4 WHT
PICK UP 5 BRN
BT06 (BRN)
GND 1
+18V 2
GND 3
FG A 4
C-DIA 5
FG B 6
CTL REF 7
C-REG. 8
LIMITER 9
+5V DIG. 10
FFC
BT01
1 -25V
2 UH 1
3 UH 2
4 +5V DIG.
5 STOP
6 RESET
7 CLOCK
8 DATA S
9 DATA K
10 GND
11 VB 14
12 GND
BT03
1 CMD 14
2 CMD 18
3 V CAPST
4 MOT GND
5 +14V
6 DIG. GND
7 +7V
8 UH 1/-21V
9 UH 2/-25V
10 -25V
BT07
LOAD 1 1
LOAD 2 2
GND 3
F.E. 4
○:DIRECT CONNECTION
□:DIP CONNECTION
:CONNECTOR
CAPSTAN MOTOR
1 GND
2 +18V
3 GND
4 FG A
5 C-DIA
6 FG B
7 CTL REF
8 C-REG.
9 LIMITER
10 +5V DIG.
CAPSTAN MOTOR
M
LOADING MOTOR
WHT 1 LOAD 1
WHT 2 LOAD 2
LOADING MOTOR
M
FULL WIDTH ERASE HEAD
B638 (RED)
WHT 1 GND
BRN 2 F.E.
FULL WIDTH ERASE HEAD

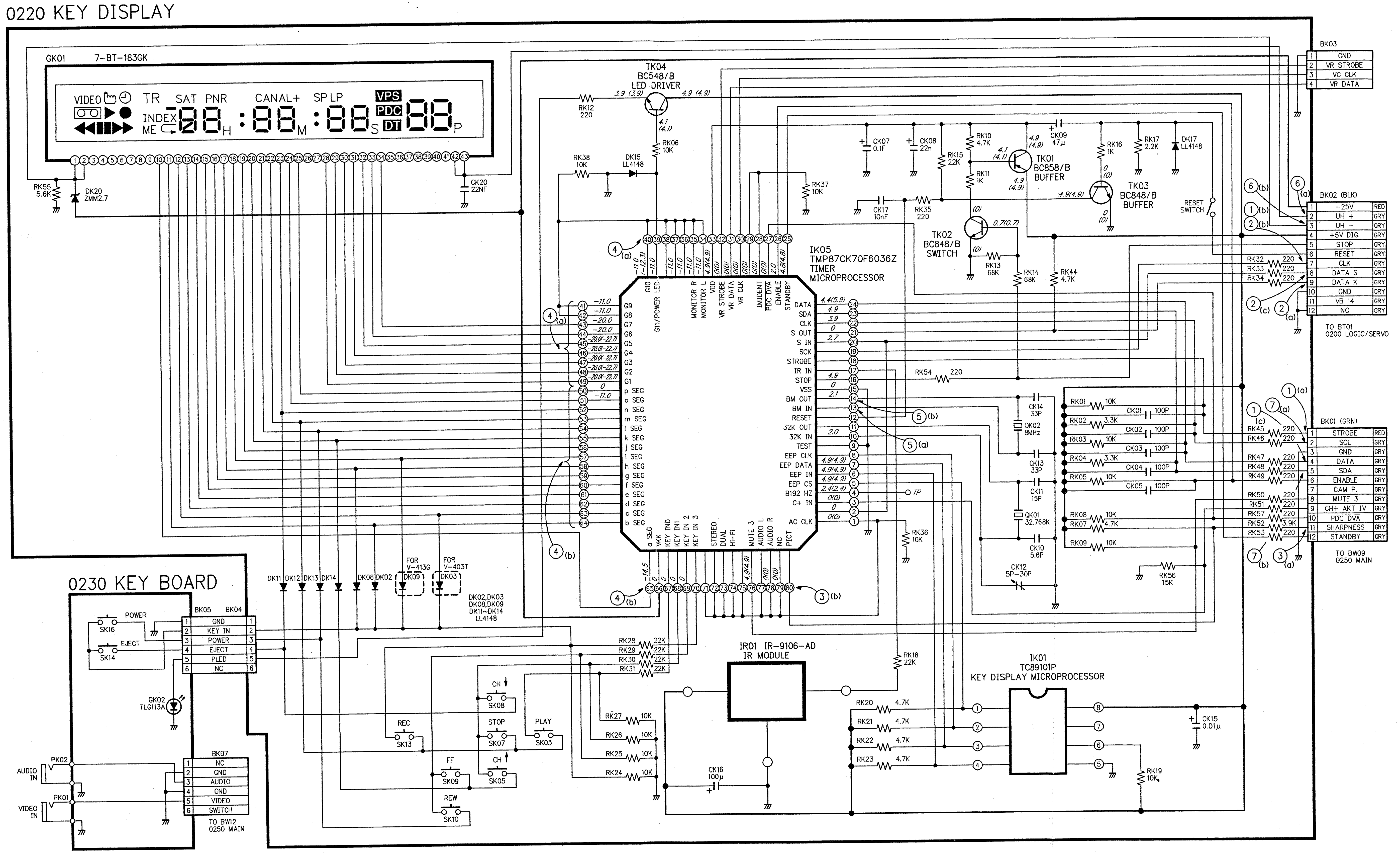
3. BLOCK DIAGRAM AND CIRCUIT DIAGRAMS

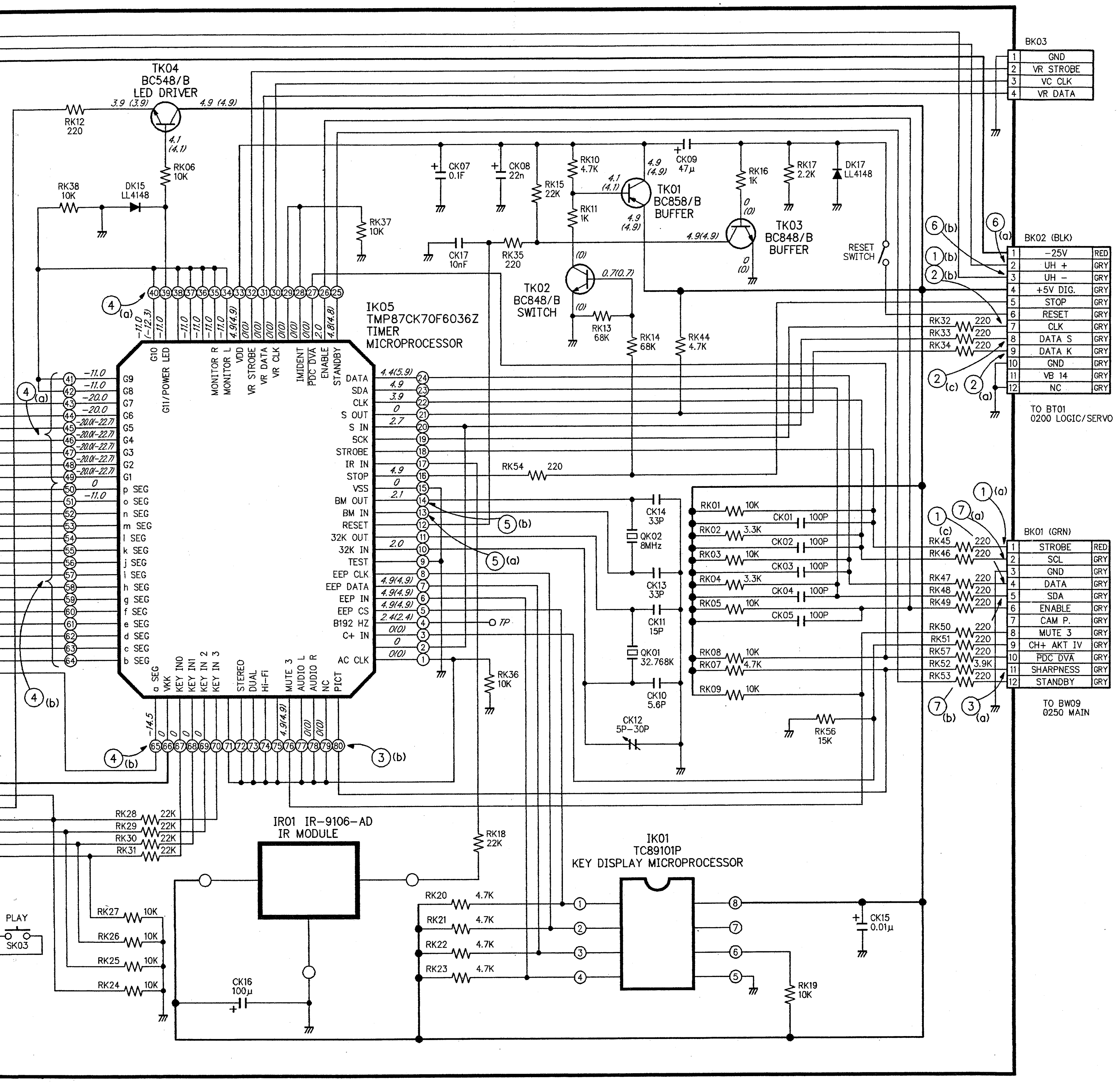
3-1. Video Block Diagram



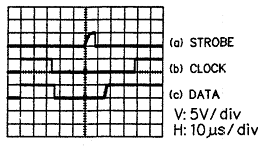
IW60 VIDEO OUTPUT SELECT
IW28 INPUT SELECTOR
OSD CIRCUIT
CV IN
C VIDEO
TA46
TO RF MOD
ATT
BW01 AV JACK
VIDEO OUT
VIDEO IN
PLAY SIGNAL
EE SIGNAL
IW65 INPUT SELECTOR
IW28 INPUT SELECTOR
RF IN
BW11 C+ JACK
REC SIGNAL
IW31 VPS
TIMER
S.DATA
VIDEO IN
(FOR V-413G)
TN01
PLAY SIGNAL
EE SIGNAL
EDIT
+12V
PN39 EE LEVEL
REC SIGNAL
+12V
TV17
PLAY COLOR SIGNAL
REC P.B
TV14
TRAP
ATT
PLAY COLOR SIGNAL
IN01 AN3248NK Y-PROCESS
VIDEO AMP
MUTE
SUB CLAMP
AGC AMP
AGC DET
SS
PLAY AMP
PLAY C-MIX
APT CTL
NC MIX
LPF
LIM
HPF
PRE AMP
MAIN DE EMPH
SHARPNESS (FROM TIMER)
Y-LPF
CLAMP
NL MIX
MAIN EMPH
W/D CLIP
NL PREAMP
DE MIX
SP/LP FMC1
HPF
LIM
SUB LPF
DEM
D LIM
DOC ENV DET
LNC MIX NL PRE AMP
PLAY ON
LIM
SUB STRUCTER
HPF
MOD
PN19 FM DEV
RN24 W-CLIP
PN44 PLAY Y LEVEL ADJ.
LPF TRAP
REC FM SIGNAL
REC COLOR SIGNAL
FM/C MIX
TF45
REC FM/C SIGNAL
REC FM LEVEL
IF21 MSM7401-RS 1H CCD
CLAMP
CCD
CLOCK
TF33
LPF
TF30
SW
LP
FV10
2H COMB FILTER
FALSE V/H GEN
PV (FROM TIMER)
PF01 PICTURE PRESET
FM EQ
TF09,06,02
PLAY FM SIGNAL
IQ01 TEA5706 PRE REC AMP
AGC DET
AGC
PEAK
PLAY AMP
LP-H SW
HA SW
SP-H SW
CH4
CH3
LP
SP
CH2
CH1
HEAD SELECT
FLIP/ FLOP
VIDEO HEAD
LP2
LP1
SP2
SP1
IV40 TA8757AN C-PROCESS
CAP FILTER
COLOR DET
PLAY AMP
ACC DET
ACC AMP
CHROM BPF
PLAY C SIGNAL
EE SIGNAL
TRAP
SEC
SSP
1.4M L.P.F
ACK
B-(DE) EMPH
MAIN CONV
R/P
CARRI BPF
PULSE GENE
OP
APC DET
B-ID DET
SUB CONV
APC ID
1/N
1/8
APC ID
PS
SECAM
VCO
ID OUT
ACK
ID LOGIC
SW
VXO (XO)
APC DET
X2
XO ADJ.
PV57 REC COLOR LEVEL
TV45
UPB+12V
TV08
TV03
FV01 LPF TRAP
PLAY COLOR SIGNAL

3-2. Key Display Circuit Diagram

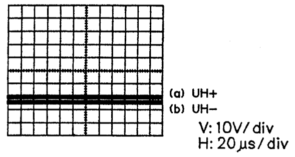

0220 KEY DISPLAY
GK01 7-BT-183GK
VIDEO TR SAT PNR CANAL+ SP LP VPS PDC DT INDEX ME
TK04 BC548/B LED DRIVER
RK12 220
RK06 10K
RK38 10K
DK15 LL4148
RK37 10K
RK55 5.6K
DK20 ZMM2.7
CK20 22NF
CK07 0.1F
CK08 22n
RK10 4.7K
RK15 22K
RK11 1K
CK09 47μ
TK01 BC858/B BUFFER
RK16 1K
RK17 2.2K
DK17 LL4148
TK03 BC848/B BUFFER
CK17 10nF
RK35 220
TK02 BC848/B SWITCH
RK13 68K
RK14 68K
RK44 4.7K
RESET SWITCH
IK05 TMP87CK70F6036Z TIMER MICROPROCESSOR
G10 G11/POWER LED MONITOR R MONITOR L VDD VR STROBE VR DATA VR CLK IMIDENT PDC DVA ENABLE STANDBY
G9 G8 G7 G6 G5 G4 G3 G2 G1 p SEG o SEG n SEG m SEG l SEG k SEG j SEG i SEG h SEG g SEG f SEG e SEG d SEG c SEG b SEG
DATA SDA CLK S OUT S IN SCK STROBE IR IN STOP VSS BM OUT BM IN RESET 32K OUT 32K IN TEST EEP CLK EEP DATA EEP IN EEP CS B192 HZ C+ IN AC CLK
a SEG VKK KEY INO KEY IN 1 KEY IN 2 KEY IN 3 STEREO DUAL Hi-Fi MUTE 3 AUDIO L AUDIO R NC PICT
RK54 220
TP
RK36 10K
CK14 33P
QK02 8MHz
CK13 33P
CK11 15P
QK01 32.768K
CK10 5.6P
CK12 5P~30P
RK01 10K RK02 3.3K RK03 10K RK04 3.3K RK05 10K
CK01 100P CK02 100P CK03 100P CK04 100P CK05 100P
RK08 10K RK07 4.7K RK09 10K
RK56 15K
BK03: 1 GND, 2 VR STROBE, 3 VC CLK, 4 VR DATA
BK02 (BLK): 1 -25V, 2 UH +, 3 UH -, 4 +5V DIG., 5 STOP, 6 RESET, 7 CLK, 8 DATA S, 9 DATA K, 10 GND, 11 VB 14, 12 NC
RED GRY
RK32 220 RK33 220 RK34 220
TO BT01 0200 LOGIC/SERVO
BK01 (GRN): 1 STROBE, 2 SCL, 3 GND, 4 DATA, 5 SDA, 6 ENABLE, 7 CAM P., 8 MUTE 3, 9 CH+ AKT IV, 10 PDC DVA, 11 SHARPNESS, 12 STANDBY
RK45 220 RK46 220 RK47 220 RK48 220 RK49 220 RK50 220 RK51 220 RK57 220 RK52 3.9K RK53 220
TO BW09 0250 MAIN
0230 KEY BOARD
BK05 BK04: 1 GND, 2 KEY IN, 3 POWER, 4 EJECT, 5 PLED, 6 NC
POWER SK16 EJECT SK14
GK02 TLG113A
BK07: 1 NC, 2 GND, 3 AUDIO, 4 GND, 5 VIDEO, 6 SWITCH
TO BW12 0250 MAIN
PK02 AUDIO IN PK01 VIDEO IN
DK11 DK12 DK13 DK14 DK08 DK02 DK09 DK03
FOR V-413G FOR V-403T
DK02,DK03 DK08,DK09 DK11~DK14 LL4148
RK28 22K RK29 22K RK30 22K RK31 22K
RK27 10K RK26 10K RK25 10K RK24 10K
CH↓ SK08 REC SK13 STOP SK07 PLAY SK03 FF SK09 CH↑ SK05 REW SK10
IR01 IR-9106-AD IR MODULE
CK16 100μ
RK18 22K
IK01 TC89101P KEY DISPLAY MICROPROCESSOR
RK20 4.7K RK21 4.7K RK22 4.7K RK23 4.7K
CK15 0.01μ
RK19 10K


TK04
BC548/B
LED DRIVER
RK12 220
RK06 10K
RK38 10K
DK15 LL4148
RK37 10K
CK07 0.1F
CK08 22n
RK15 22K
RK10 4.7K
RK11 1K
TK01 BC858/B BUFFER
CK09 47μ
RK16 1K
RK17 2.2K
DK17 LL4148
TK03 BC848/B BUFFER
CK17 10nF
RK35 220
TK02 BC848/B SWITCH
RK13 68K
RK14 68K
RK44 4.7K
RESET SWITCH
IK05
TMP87CK70F6036Z
TIMER
MICROPROCESSOR
G9 G8 G7 G6 G5 G4 G3 G2 G1
p SEG o SEG n SEG m SEG l SEG k SEG j SEG i SEG h SEG g SEG f SEG e SEG d SEG c SEG b SEG
G10 G11/POWER LED MONITOR R MONITOR L VDD VR STROBE VR DATA VR CLK IMIDENT PDC DVA ENABLE STANDBY
DATA SDA CLK S OUT S IN SCK STROBE IR IN STOP VSS BM OUT BM IN RESET 32K OUT 32K IN TEST EEP CLK EEP DATA EEP IN EEP CS B192 HZ C+ IN AC CLK
a SEG VKK KEY IN0 KEY IN1 KEY IN 2 KEY IN 3 STEREO DUAL HI-FI MUTE 3 AUDIO R AUDIO R NC PICT
RK54 220
CK14 33P
QK02 8MHz
CK13 33P
CK11 15P
QK01 32.768K
CK10 5.6P
CK12 5P-30P
RK36 10K
TP
RK01 10K RK02 3.3K RK03 10K RK04 3.3K RK05 10K
CK01 100P CK02 100P CK03 100P CK04 100P CK05 100P
RK08 10K RK07 4.7K RK09 10K
RK56 15K
RK32 220 RK33 220 RK34 220
RK45 220 RK46 220 RK47 220 RK48 220 RK49 220 RK50 220 RK51 220 RK57 220 RK52 3.9K RK53 220
BK03
1 GND
2 VR STROBE
3 VC CLK
4 VR DATA
BK02 (BLK)
1 -25V RED
2 UH + GRY
3 UH – GRY
4 +5V DIG. GRY
5 STOP GRY
6 RESET GRY
7 CLK GRY
8 DATA S GRY
9 DATA K GRY
10 GND GRY
11 VB 14 GRY
12 NC GRY
TO BT01
0200 LOGIC/SERVO
BK01 (GRN)
1 STROBE RED
2 SCL GRY
3 GND GRY
4 DATA GRY
5 SDA GRY
6 ENABLE GRY
7 CAM P. GRY
8 MUTE 3 GRY
9 CH+ AKT IV GRY
10 PDC DVA GRY
11 SHARPNESS GRY
12 STANDBY GRY
TO BW09
0250 MAIN
RK28 22K RK29 22K RK30 22K RK31 22K
IR01 IR-9106-AD
IR MODULE
RK18 22K
IK01
TC89101P
KEY DISPLAY MICROPROCESSOR
RK20 4.7K RK21 4.7K RK22 4.7K RK23 4.7K
CK15 0.01μ
RK19 10K
PLAY SK03
RK27 10K RK26 10K RK25 10K RK24 10K
CK16 100μ

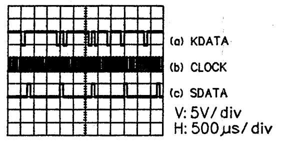
① (a)BK01,Pin ① D-11
(b)BK02,Pin ⑦ C-11
(c)BK01,Pin ④ D-11



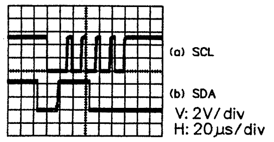
⑥ (a)BK02,Pin ② C-11
(b)BK02,Pin ③ C-11



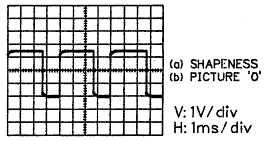
② (a)BK02,Pin ⑨ D-11
(b)BK02,Pin ⑦ C-11
(c)BK02,Pin ⑧ C-11



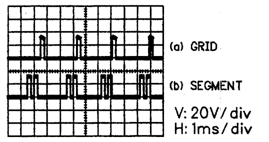
⑦ (a)BK01,Pin ② D-11
(b)BK01,Pin ⑤ E-11



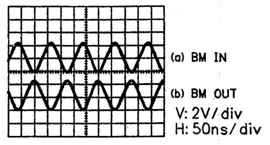
③ (a)BK01,Pin ⑪ E-11
(b)IK05,Pin (80) F-7



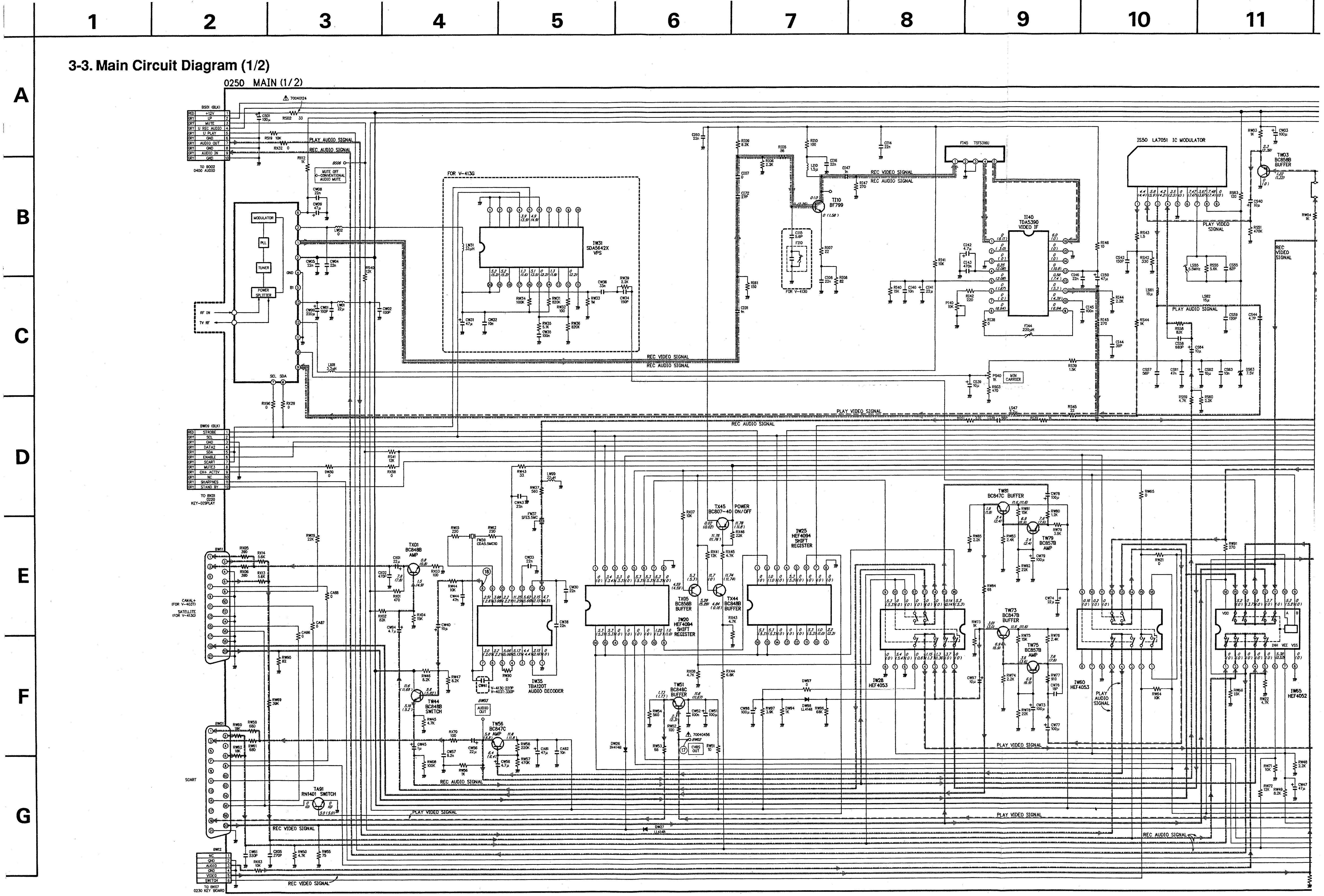
④ (a)IK05,Pin ㊵ - ㊾ C-6, D-5
(b)IK05,Pin ㊿ - (65) E-5, F-6

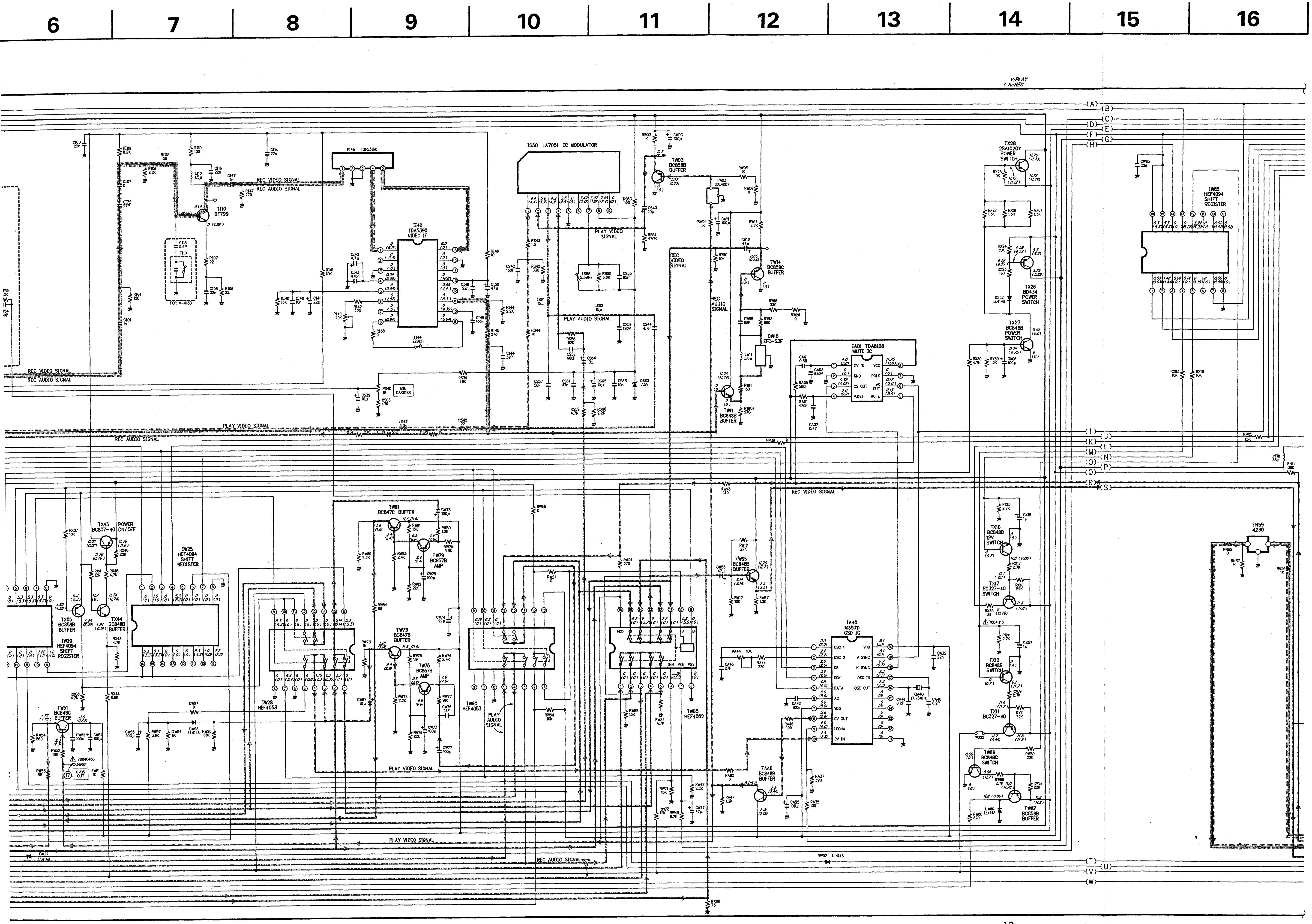


⑤ (a)IK05,Pin ⑬ D-8
(b)IK05,Pin ⑭ D-8

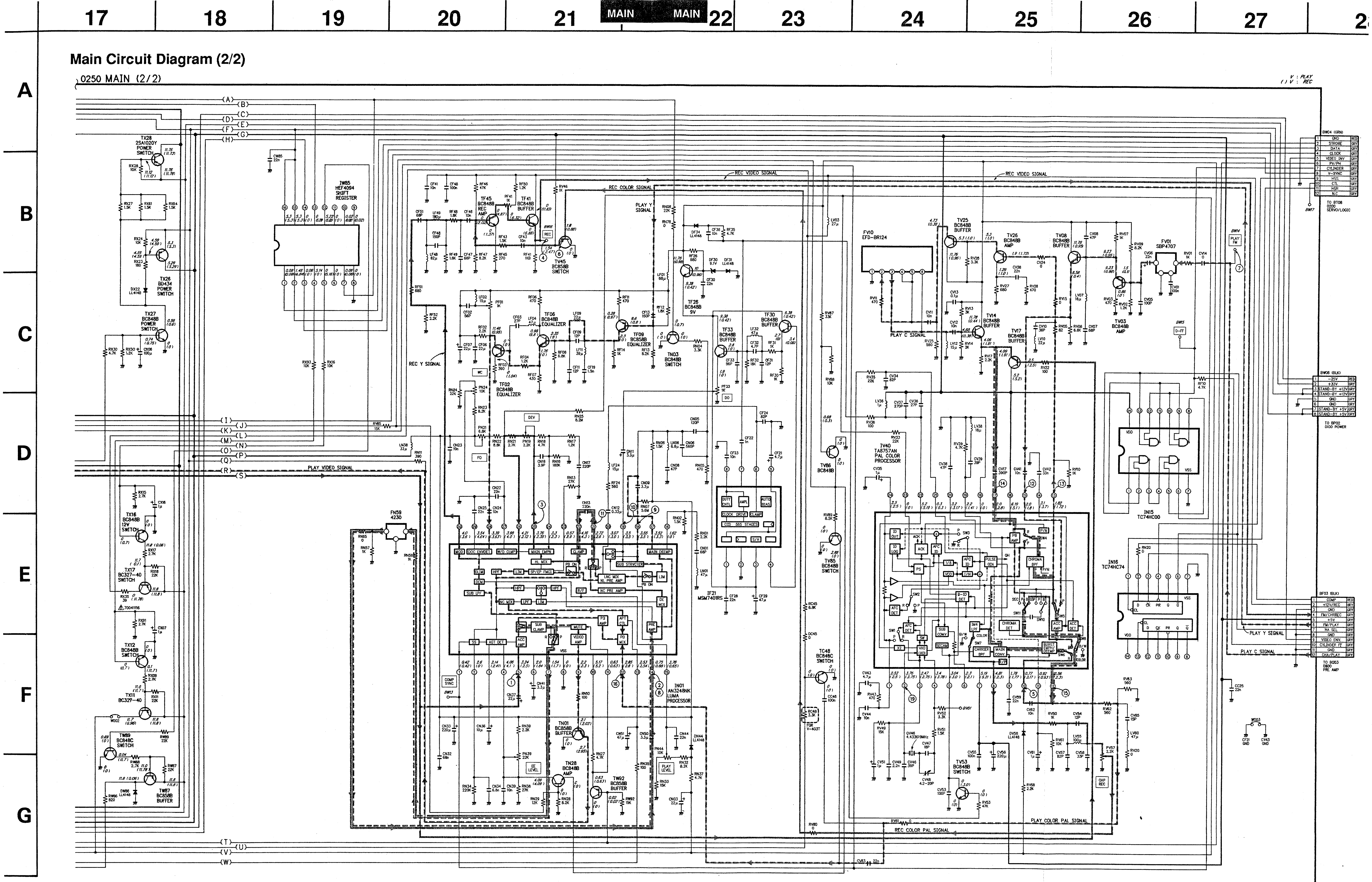


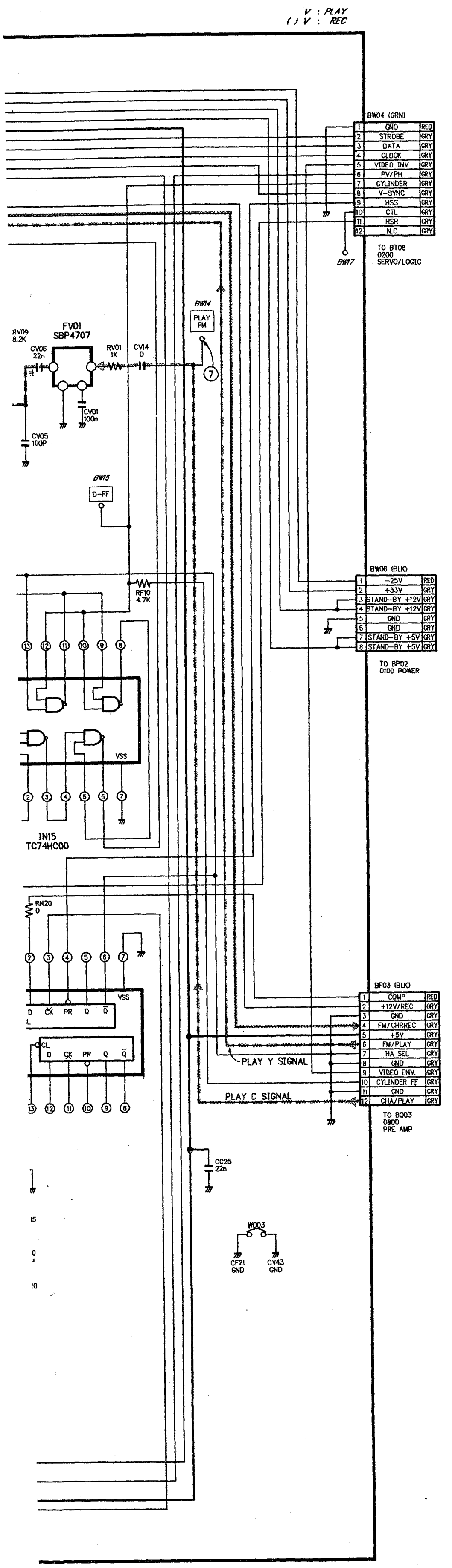
3-3. Main Circuit Diagram (1/2)

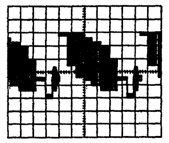
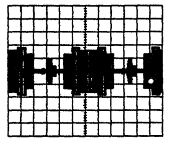
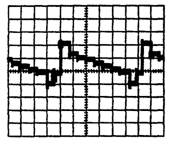
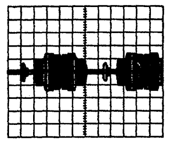
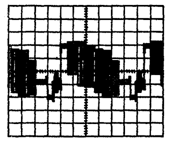
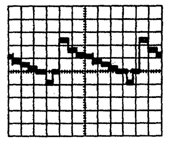
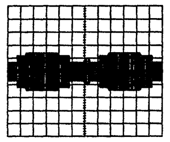
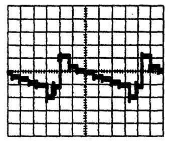
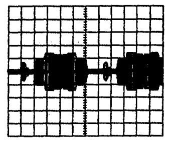
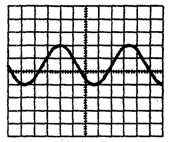
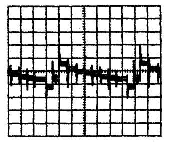
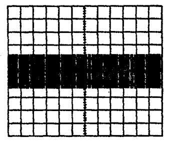
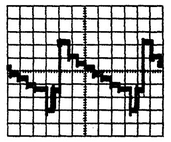
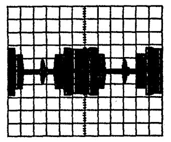
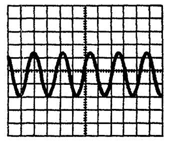
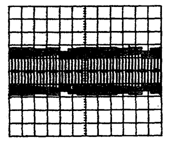
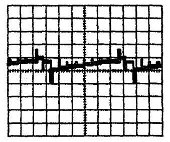
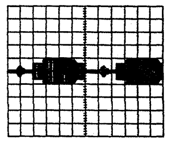
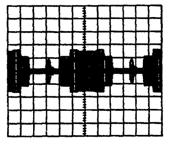

1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
0250 MAIN (1/2)
BS01 (BLK)
TO B002 0400 AUDIO
PLAY AUDIO SIGNAL
REC AUDIO SIGNAL
MUTE OFF O-CONVENTIONAL AUDIO MUTE
MODULATOR
PLL
TUNER
POWER SPLITTER
RF IN
TV RF
FOR V-413G
IW31 SDA5642X VPS
REC VIDEO SIGNAL
TI10 BF799
FOR V-413G
FI45 TSF5316U
II40 TDA5390 VIDEO IF
IS50 LA7051 IC MODULATOR
TW03 BC858B BUFFER
PLAY VIDEO SIGNAL
MIN CARRIER
PLAY AUDIO SIGNAL
REC VIDEO SIGNAL
BW09 (BLK)
STROBE
SCL
GND
DATA2
SDA
ENABLE
SCART
MUTE3
CH+ ACTIV
NC
SHARPNES
STAND BY
TO BK01 0220 KEY-DISPLAY
BW11
CANAL+ (FOR V-403T)
SATELLITE (FOR V-413G)
TX01 BC848B AMP
TW44 BC848B SWITCH
IW35 TBA120T AUDIO DECODER
TW56 BC847C AMP
AUDIO OUT
TX45 BC807-40 POWER ON/OFF
TX05 BC858B BUFFER
TX44 BC848B BUFFER
IW20 HEF4094 SHIFT REGISTER
IW25 HEF4094 SHIFT REGISTER
TW51 BC848C BUFFER
CVBS OUT
IW28 HEF4053
TW81 BC847C BUFFER
TW79 BC857B AMP
TW73 BC847B BUFFER
TW75 BC857B AMP
IW60 HEF4053
PLAY AUDIO SIGNAL
IW65 HEF4052
BW01
SCART
TA91 RN1401 SWITCH
REC AUDIO SIGNAL
PLAY VIDEO SIGNAL
REC VIDEO SIGNAL
BW12
NC
GND
AUDIO
GND
VIDEO
SWITCH
TO BK07 0230 KEY BOARD
REC AUDIO SIGNAL


6
7
8
9
10
11
12
13
14
15
16
V:PLAY
( ):REC
REC VIDEO SIGNAL
REC AUDIO SIGNAL
TI10 BF799
FOR V-4130
FI45 TSF5318U
II40 TDA5390 VIDEO IF
FI44 220μH
MIN CARRIER
IS50 LA7051 IC MODULATOR
PLAY VIDEO SIGNAL
PLAY AUDIO SIGNAL
LS55 5.5MHz
TW03 BC858B BUFFER
FW03 SDL4007
REC VIDEO SIGNAL
REC AUDIO SIGNAL
TW14 BC858C BUFFER
QW10 EFC-S3F
TW11 BC848B BUFFER
IA01 TDA8128 MUTE IC
CV IN
GND
CS OUT
P.DET
VCC
POLS
VS OUT
MUTE
TX28 2SA1020Y POWER SWITCH
TX26 BD434 POWER SWITCH
TX27 BC848B POWER SWITCH
IW85 HEF4094 SHIFT REGISTER
(A)
(B)
(C)
(D)
(E)
(F)
(G)
(H)
(I)
(J)
(K)
(L)
(M)
(N)
(O)
(P)
(Q)
(R)
(S)
(T)
(U)
(V)
(W)
TX45 BC807-40 POWER ON/OFF
TX05 BC858B BUFFER
TX44 BC848B BUFFER
IW20 HEF4094 SHIFT REGISTER
IW25 HEF4094 SHIFT REGISTER
TW51 BC848C BUFFER
CVBS OUT
DW27 LL4148
IW28 HEF4053
TW81 BC847C BUFFER
TW79 BC857B AMP
TW73 BC847B BUFFER
TW75 BC857B AMP
IW60 HEF4053
PLAY AUDIO SIGNAL
PLAY VIDEO SIGNAL
REC AUDIO SIGNAL
IW65 HEF4052
VDD
INH
VEE
VSS
TW85 BC848B BUFFER
IA40 M35011 OSD IC
OSC 1
OSC 2
CS
SCK
DATA
AC
VDD
CV OUT
LECHA
CV IN
V SYNC
H SYNC
OSC IN
OSC OUT
QA40 17.734MHz
TA46 BC848B BUFFER
DW92 LL4148
TX16 BC848B 12V SWITCH
TX17 BC327-40 SWITCH
TX12 BC848B SWITCH
TX11 BC327-40
TW89 BC848C SWITCH
TW87 BC858B BUFFER
DW86 LL4148
FN59 4230
LN38 33μ
RW90 75

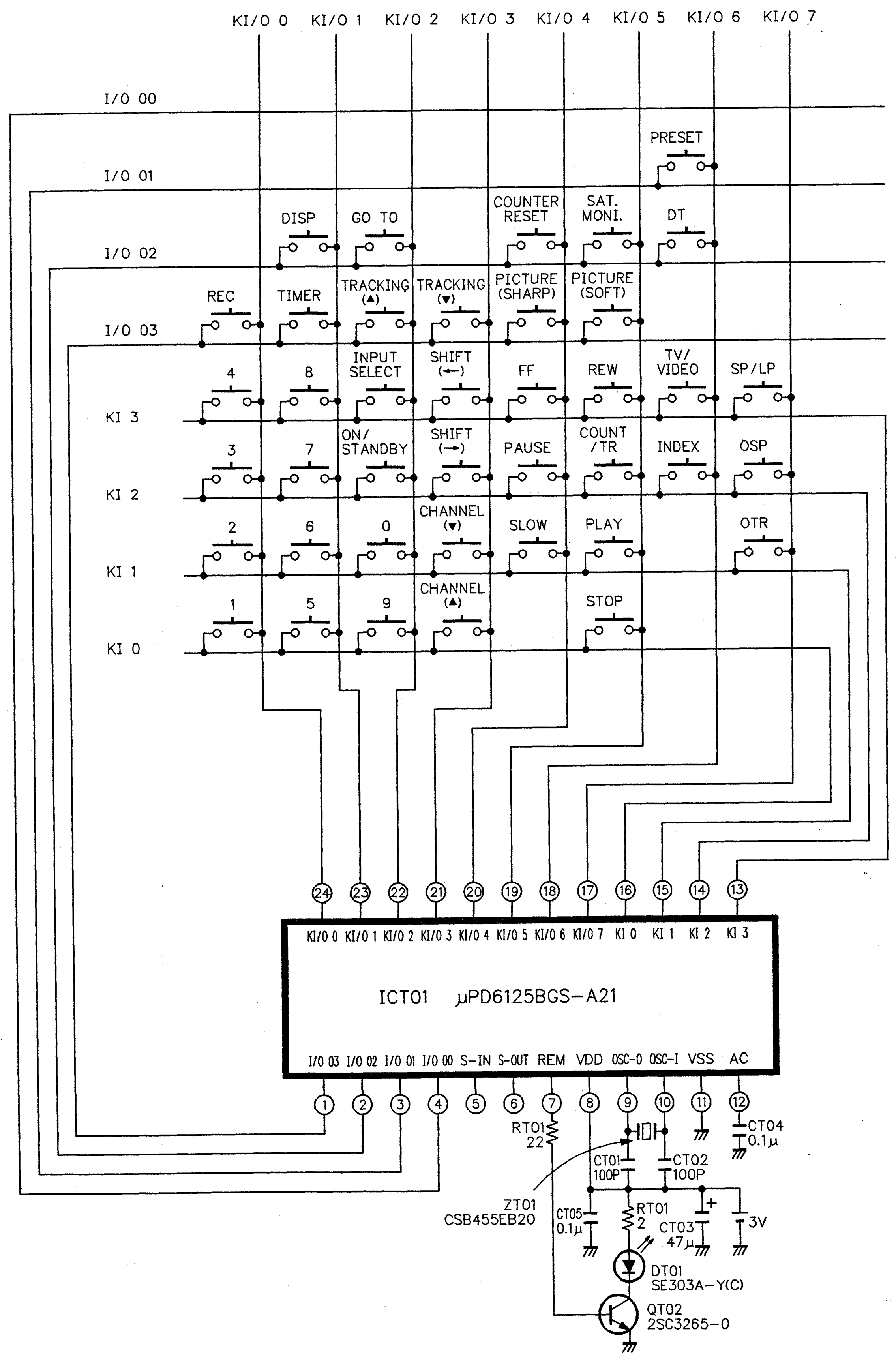
Main Circuit Diagram (2/2)


17
18
19
20
21
22
23
24
25
26
27
A
B
C
D
E
F
G
0250 MAIN (2/2)
V : PLAY
( ) V : REC
TX28 2SA1020Y POWER SWITCH
TX26 BD434 POWER SWITCH
TX27 BC848B POWER SWITCH
IW85 HEF4094 SHIFT REGISTER
TX16 BC848B 12V SWITCH
TX17 BC327-40 SWITCH
TX12 BC848B SWITCH
TX11 BC327-40
TW89 BC848C SWITCH
TW87 BC858B BUFFER
FN59 4230
TF45 BC848B REC AMP
TF41 BC848B BUFFER
TV45 BC858B SWITCH
TF06 BC848B EQUALIZER
TF02 BC848B EQUALIZER
TF09 BC858B EQUALIZER
TF26 BC848B 9V
TN03 BC848B SWITCH
TF33 BC848B BUFFER
TF30 BC848B BUFFER
REC COLOR SIGNAL
REC VIDEO SIGNAL
PLAY Y SIGNAL
REC Y SIGNAL
PLAY VIDEO SIGNAL
IN01 AN3248NK LUMA PROCESSOR
TN01 BC858B BUFFER
TN28 BC848B AMP
TW92 BC858B BUFFER
IF21 MSM7401RS
TV86 BC848B
TV85 BC848B SWITCH
TC48 BC848C SWITCH
FV10 EFD-BR124
TV25 BC848B BUFFER
TV26 BC848B AMP
TV08 BC848B BUFFER
FV01 SBP4707
TV14 BC848B BUFFER
TV17 BC848B BUFFER
TV03 BC848B AMP
PLAY C SIGNAL
IV40 TA8757AN PAL COLOR PROCESSOR
TV53 BC848B SWITCH
IN15 TC74HC00
IN16 TC74HC74
PLAY Y SIGNAL
PLAY C SIGNAL
PLAY COLOR PAL SIGNAL
REC COLOR PAL SIGNAL
BW04 (GRN)
1 GND
2 STROBE
3 DATA
4 CLOCK
5 VIDEO INV
6 PV/PH
7 CYLINDER
8 V-SYNC
9 HSS
10 CTL
11 HSR
12 N.C
TO BT06 0200 SERVO/LOGIC
BW06 (BLK)
1 -25V
2 +33V
3 STAND-BY +12V
4 STAND-BY +12V
5 GND
6 GND
7 STAND-BY +5V
8 STAND-BY +5V
TO BP02 0100 POWER
BF03 (BLK)
1 COMP
2 +12V/REC
3 GND
4 FM/CHR REC
5 +5V
6 FM/PLAY
7 HA SEL
8 GND
9 VIDEO ENV.
10 CYLINDER FF
11 GND
12 CHA/PLAY
TO B003 0800 PRE AMP

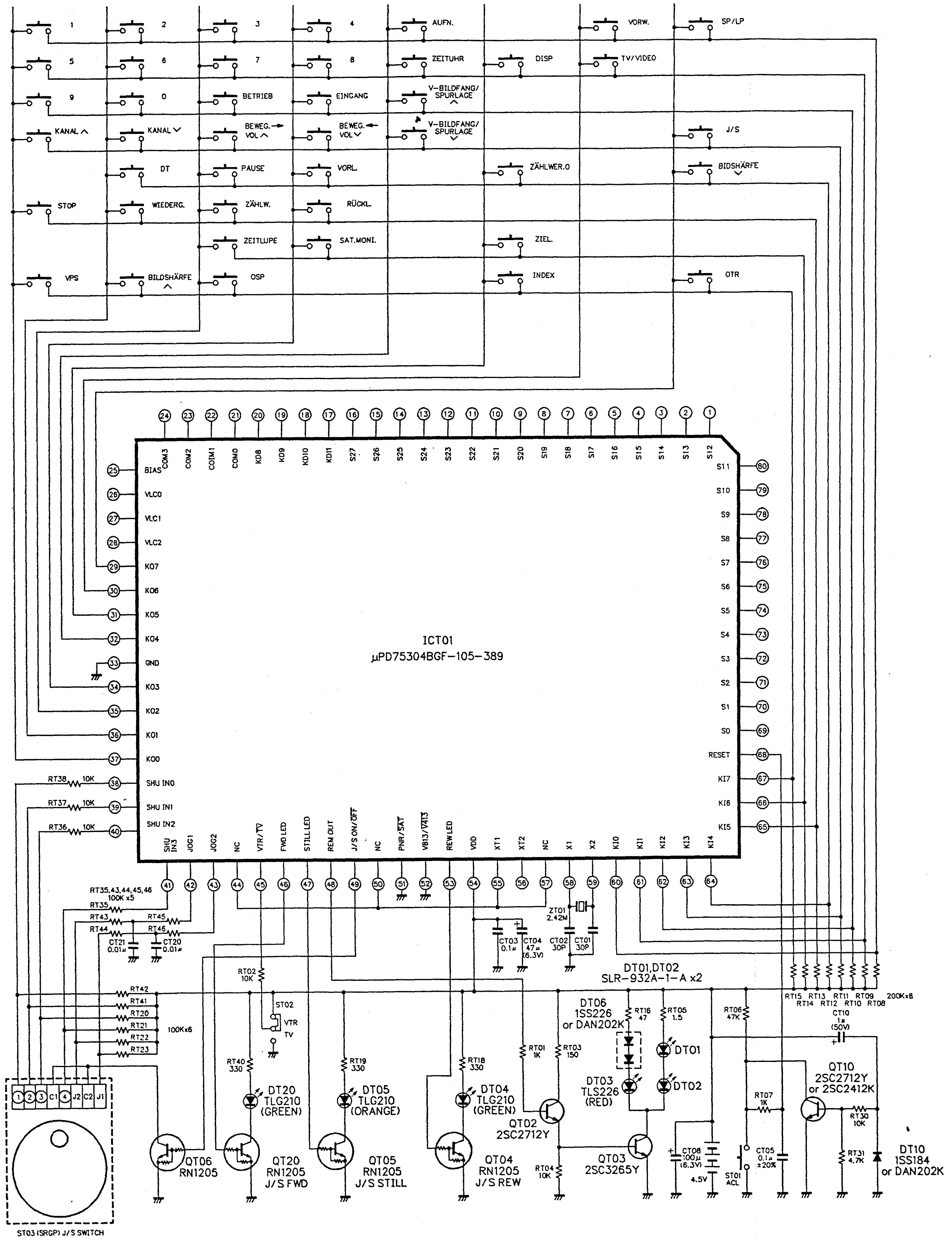

V : PLAY
( ) V : REC
BW04 (GRN)
1 GND RED
2 STROBE GRY
3 DATA GRY
4 CLOCK GRY
5 VIDEO INV GRY
6 PV/PH GRY
7 CYLINDER GRY
8 V-SYNC GRY
9 HSS GRY
10 CTL GRY
11 HSR GRY
12 N.C GRY
TO BT08
0200
SERVO/LOGIC
BW17
RV09
8.2K
FV01
SBP4707
CV06
22n
RV01
1K
CV14
0
BW14
PLAY
FM
⑦
CV01
100n
CV05
100P
BW15
D-FF
RF10
4.7K
BW06 (BLK)
1 -25V RED
2 +33V GRY
3 STAND-BY +12V GRY
4 STAND-BY +12V GRY
5 GND GRY
6 GND GRY
7 STAND-BY +5V GRY
8 STAND-BY +5V GRY
TO BP02
0100 POWER
VSS
IN15
TC74HC00
RN20
0
VSS
CK PR Q Q
CL
D CK PR Q Q
BF03 (BLK)
1 COMP RED
2 +12V/REC GRY
3 GND GRY
4 FM/CHRREC GRY
5 +5V GRY
6 FM/PLAY GRY
7 HA SEL GRY
8 GND GRY
9 VIDEO ENV. GRY
10 CYLINDER FF GRY
11 GND GRY
12 CHA/PLAY GRY
TO BQ03
0800
PRE AMP
PLAY Y SIGNAL
PLAY C SIGNAL
CC25
22n
W003
CF21
GND
CV43
GND

REC	PLAY			PIF
① IN01, Pin ⑤ F-21  V: 0.2V/div H: 10μs/div	⑤ IV40, Pin ⑩ F-25  V: 0.2V/div H: 10μs/div	⑨ IN01, Pin ⑱ E-22  V: 0.1V/div H: 10μs/div	⑬ IV40, Pin ⑬ D-12  V: 0.1V/div H: 10μs/div	⑰ BW02 F-6  V: 0.5V/div H: 10μs/div
② IN01, Pin ⑭ F-22  V: 0.1V/div H: 10μs/div	⑥ TV45 EMITTER B-21  V: 20mV/div H: 10μs/div	⑩ IN01, Pin ⑲ E-22  V: 0.1V/div H: 10μs/div	⑭ IV40, Pin ⑰ D-12  V: 0.1V/div H: 10μs/div	⑱ IW35, Pin ⑧ E-4  V: 0.5V/div H: 0.2ms/div
③ IN01, Pin ㉕ D-21  V: 0.2V/div H: 10μs/div	⑦ BW14 B-27  V: 0.2V/div H: 5ms/div	⑪ IN01, Pin ㉑ E-21  V: 0.2V/div H: 10μs/div	⑮ IV40, Pin ⑫ F-25  V: 0.2V/div H: 10μs/div	⑲ IV40, Pin ② F-24  V: 0.2V/div H: 0.1μs/div
④ BW16 B-21  V: 0.2V/div H: 10μs/div	⑧ IN01, Pin ⑭ F-22  V: 0.1V/div H: 10μs/div	⑫ IV40, Pin ⑮ D-12  V: 0.1V/div H: 10μs/div	⑯ IN01, Pin ⑫ F-22  V: 0.1V/div H: 10μs/div	

3-4. Remote Control Circuit Diagram (V-403T)

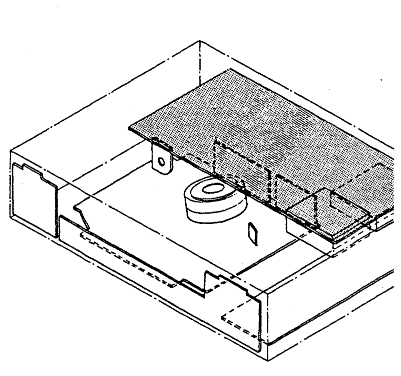

KI/O 0
KI/O 1
KI/O 2
KI/O 3
KI/O 4
KI/O 5
KI/O 6
KI/O 7
I/O 00
I/O 01
I/O 02
I/O 03
KI 3
KI 2
KI 1
KI 0
PRESET
DISP
GO TO
COUNTER RESET
SAT. MONI.
DT
REC
TIMER
TRACKING (▲)
TRACKING (▼)
PICTURE (SHARP)
PICTURE (SOFT)
4
8
INPUT SELECT
SHIFT (←)
FF
REW
TV/ VIDEO
SP/LP
3
7
ON/ STANDBY
SHIFT (→)
PAUSE
COUNT /TR
INDEX
OSP
2
6
0
CHANNEL (▼)
SLOW
PLAY
OTR
1
5
9
CHANNEL (▲)
STOP
ICT01 µPD6125BGS-A21
KI/O 0 KI/O 1 KI/O 2 KI/O 3 KI/O 4 KI/O 5 KI/O 6 KI/O 7 KI 0 KI 1 KI 2 KI 3
I/O 03 I/O 02 I/O 01 I/O 00 S-IN S-OUT REM VDD OSC-O OSC-I VSS AC
RT01 22
CT04 0.1µ
CT01 100P
CT02 100P
ZT01 CSB455EB20
CT05 0.1µ
RT01 2
CT03 47µ
3V
DT01 SE303A-Y(C)
QT02 2SC3265-O

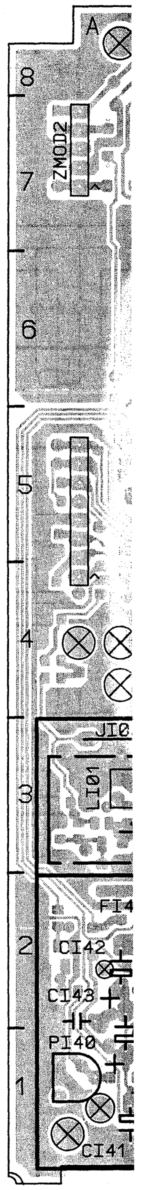
3-5. Remote Control Circuit Diagram (V-413G)


1
2
3
4
AUFN.
VORW.
SP/LP
5
6
7
8
ZEITUHR
DISP
TV/VIDEO
9
0
BETRIEB
EINGANG
V-BILDFANG/ SPURLAGE ^
KANAL ^
KANAL ∨
BEWEG. → VOL ^
BEWEG. ← VOL ∨
V-BILDFANG/ SPURLAGE ∨
J/S
DT
PAUSE
VORL.
ZÄHLWER.O
BIDSHÄRFE ∨
STOP
WIEDERG.
ZÄHLW.
RÜCKL.
ZEITLUPE
SAT.MONI.
ZIEL.
VPS
BILDSHÄRFE ^
OSP
INDEX
OTR
ICT01 µPD75304BGF-105-389
COM3 COM2 COM1 COM0 KI08 KI09 KI010 KI011 S27 S26 S25 S24 S23 S22 S21 S20 S19 S18 S17 S16 S15 S14 S13 S12
BIAS VLC0 VLC1 VLC2 KO7 KO6 KO5 KO4 GND KO3 KO2 KO1 KO0 SHU IN0 SHU IN1 SHU IN2
S11 S10 S9 S8 S7 S6 S5 S4 S3 S2 S1 S0 RESET KI7 KI6 KI5
SHU IN3 JOG1 JOG2 NC VTR/TV FWD LED STILL LED REM OUT J/S ON/OFF NC PNR/SAT V813/V413 REW LED VDD XT1 XT2 NC X1 X2 KI0 KI1 KI2 KI3 KI4
RT38 10K
RT37 10K
RT36 10K
RT35,43,44,45,46 100K x5
RT35
RT43
RT44
RT45
RT46
CT21 0.01µ
CT20 0.01µ
ZT01 2.42M
CT03 0.1µ
CT04 47µ (6.3V)
CT02 30P
CT01 30P
DT01,DT02 SLR-932A-1-A x2
RT15 RT14 RT13 RT12 RT11 RT10 RT09 RT08 200K×8
RT02 10K
RT42
RT41
RT20
RT21
RT22
RT23
100K×6
ST02
VTR
TV
RT40 330
DT20 TLG210 (GREEN)
RT19 330
DT05 TLG210 (ORANGE)
RT18 330
DT04 TLG210 (GREEN)
DT06 1SS226 or DAN202K
RT16 47
RT05 1.5
RT01 1K
RT03 150
DT01
DT03 TLS226 (RED)
DT02
RT06 47K
CT10 1µ (50V)
QT10 2SC2712Y or 2SC2412K
RT07 1K
RT30 10K
QT02 2SC2712Y
QT03 2SC3265Y
RT04 10K
CT08 100µ (6.3V)
4.5V
ST01 ACL
CT05 0.1µ ±20%
RT31 4.7K
DT10 1SS184 or DAN202K
QT06 RN1205
QT20 RN1205 J/S FWD
QT05 RN1205 J/S STILL
QT04 RN1205 J/S REW
1 2 3 C1 4 J2 C2 J1
ST03 (SRGP) J/S SWITCH

4. PC Boards

4-1. Main PC Board

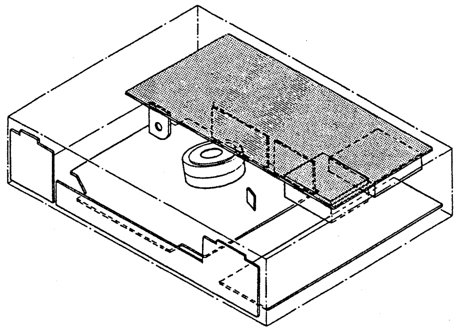



A
8
ZMOD2
7
6
5
4
JIC
3
LI01
F14
2
CI42
CI43
PI40
1
CI41

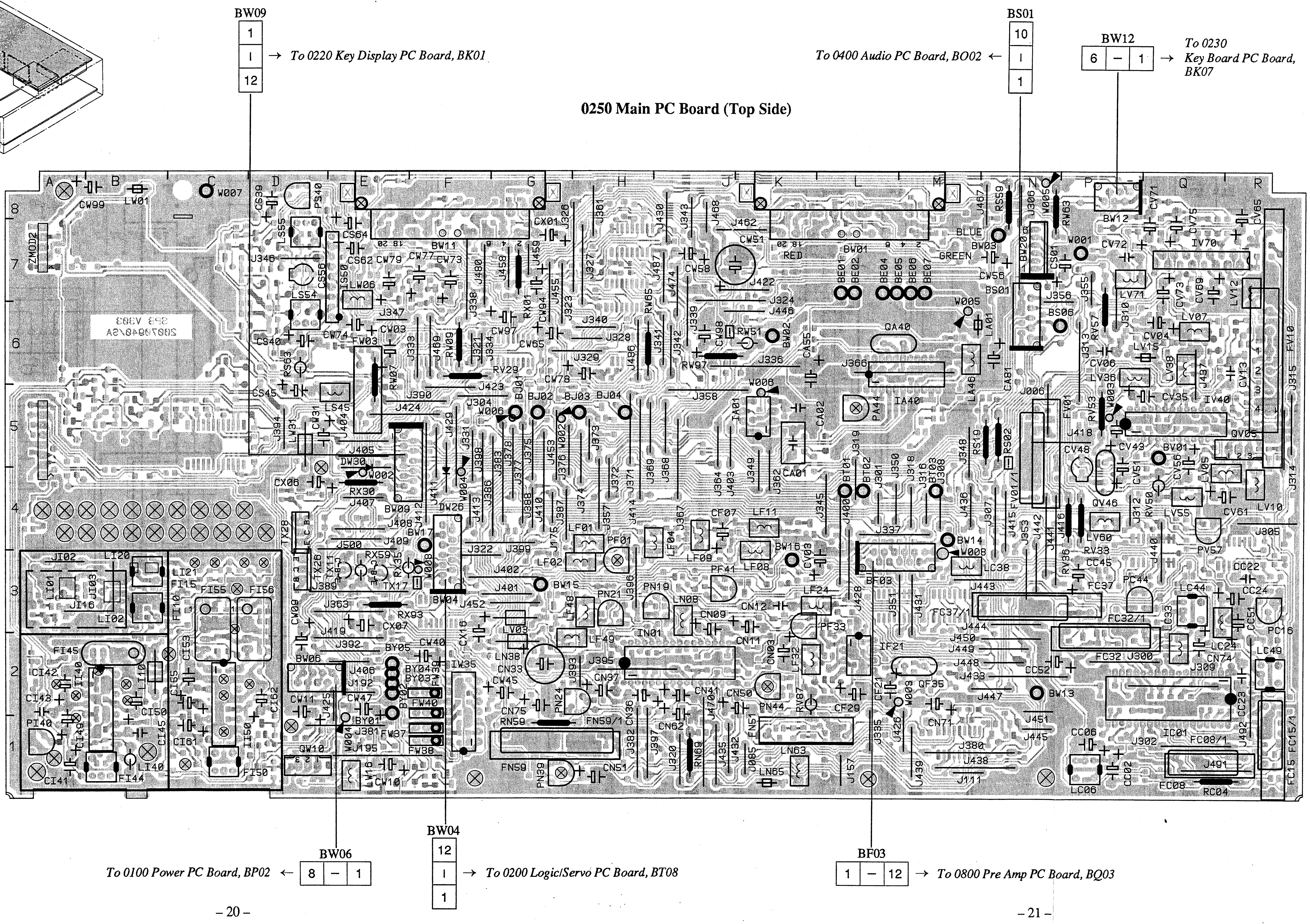
11 10 9 8 7 6 5 4 3 2 1

4. PC Boards

4-1. Main PC Board



0250 Main PC Board (Top Side)

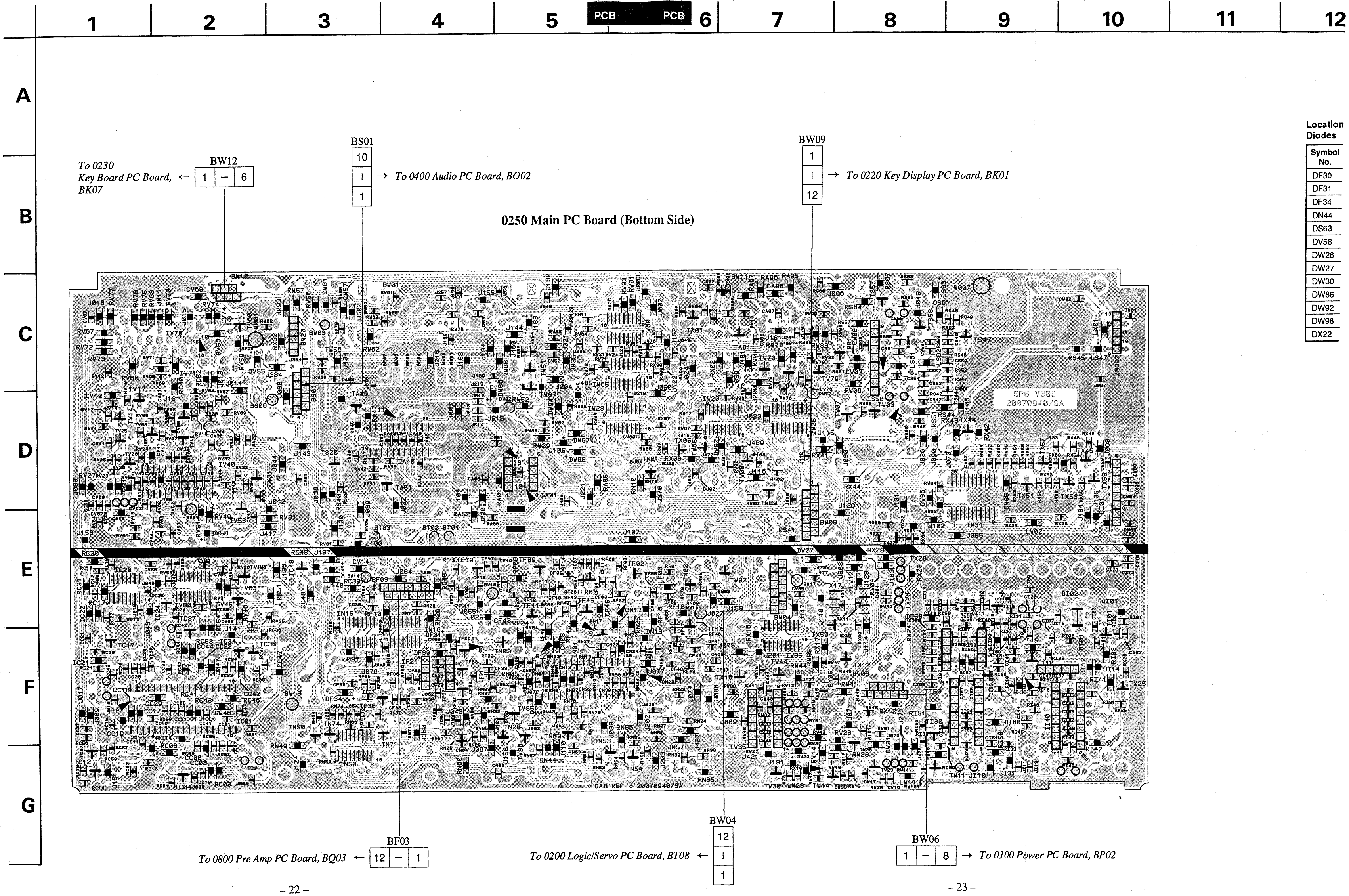

BW09
1
|
12
→ To 0220 Key Display PC Board, BK01
BS01
10
|
1
To 0400 Audio PC Board, BO02 ←
BW12
6 – 1
→ To 0230 Key Board PC Board, BK07
BW06
To 0100 Power PC Board, BP02 ← 8 – 1
BW04
12
|
1
→ To 0200 Logic/Servo PC Board, BT08
BF03
1 – 12
→ To 0800 Pre Amp PC Board, BQ03
A B C D E F G H J K M N P Q R
1 2 3 4 5 6 7 8

A
B
C
D
E
F
G

200Kx8

DT10
1SS184
or DAN202K

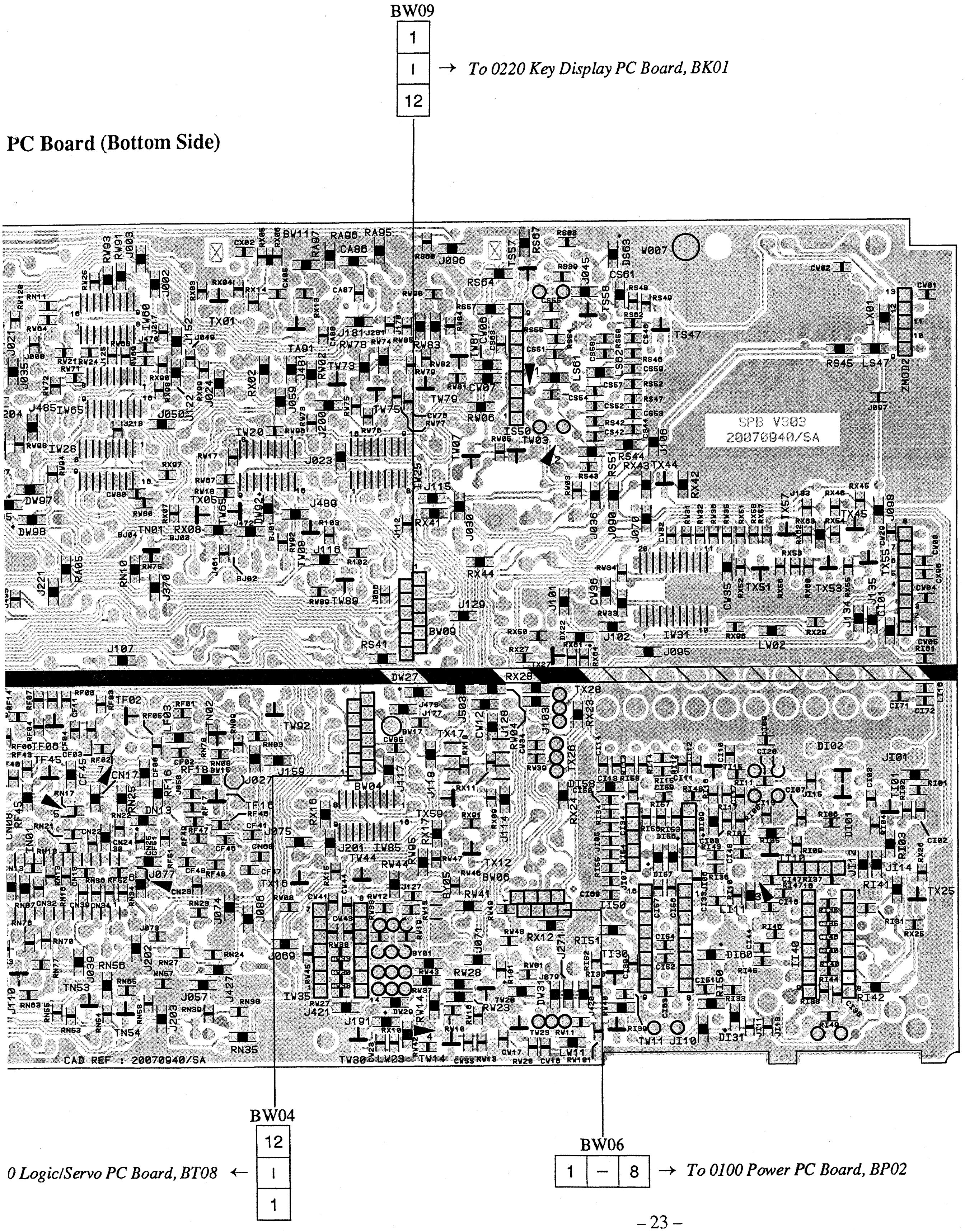
0250 Main PC Board (Bottom Side)


1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
To 0230 Key Board PC Board, BK07
BW12
1 – 6
BS01
10
|
1
To 0400 Audio PC Board, BO02
BW09
1
|
12
To 0220 Key Display PC Board, BK01
SPB V303
20070940/SA
CAD REF : 20070940/SA
BF03
To 0800 Pre Amp PC Board, BQ03
12 – 1
BW04
12
|
1
To 0200 Logic/Servo PC Board, BT08
BW06
1 – 8
To 0100 Power PC Board, BP02

Location Diodes

Symbol No.
DF30
DF31
DF34
DN44
DS63
DV58
DW26
DW27
DW30
DW86
DW92
DW98
DX22

PC Board (Bottom Side)


BW09
1
I
12
→ To 0220 Key Display PC Board, BK01
SPB V303
20070940/SA
CAD REF : 20070940/SA
BW04
12
I
1
0 Logic/Servo PC Board, BT08 ←
BW06
1 – 8
→ To 0100 Power PC Board, BP02

Location of Diodes

Symbol No.	Location
DF30	F-4*
DF31	F-4*
DF34	F-3*
DN44	G-5*
DS63	C-9*
DV58	E-2*
DW26	E-7
DW27	E-7*
DW30	E-8*
DW86	C-6*
DW92	D-6*
DW98	D-5*
DX22	E-8*

Location of ICs

Symbol No.	Location
IA01	D-5
IA40	D-4
IF21	F-4
II40	F-10
IN01	F-5
IN15	E-3*
IN16	F-4*
IS50	C-8
IV40	D-1
IW20	D-6*
IW25	D-7*
IW28	D-5*
IW31#	E-9*
IW35	F-7
IW60	C-6*
IW65	C-5*
IW85	F-7

Location of Adjusting Parts

Symbol No.	Location
CV48	D-2
FI10#	F-9
LS55	C-8
PA44	D-4
PF01	E-6
PF33	F-4
PF41	E-5
PI40	F-10
PN19	E-5
PN21	F-6
PN24	F-6
PN39	G-6
PN44	F-5
PS40	C-8
PV57	E-1

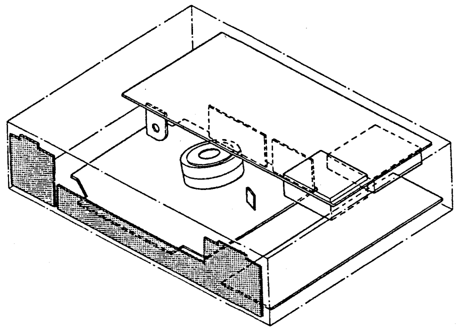
Location of Transistors
V: (REC), (V): PLAY

Symbol No.	Voltage (Unit: V)			Location
	E	C	B	
TA46	5.1(5.1)	2.18(2.18)	2.8(2.86)	D-3*
TA91	0(0)	0(0)	5.0(5.0)	C-7*
TC48	0(0)	0(0)	0(0)	E-3*
TF02	0(1.04)	11.46(0.95)	0(0)	E-3*
TF06	1.76(0)	0.98(9.8)	2.35(0)	E-5*
TF09	0.28(0.97)	2.3(0)	9.6(0.8)	E-5*
TF26	9.38(0.42)	11.76(0.96)	10(0.96)	F-4*
TF30	2.7(0)	9.38(0.42)	3.4(0.06)	F-4*
TF33	1.9(0)	9.38(0.42)	2.6(0)	F-4*
TF41	0(6.88)	0(11.83)	0(6.32)	E-5*
TF45	0(1.37)	0(4.87)	0(2.02)	E-5*
TI10	0(1.58)	0(0)	0(2.26)	F-9*
TN01	2.7(2.55)	0(0)	2.1(2.03)	D-6*
TN03	0(0)	0(0)	0(0.7)	F-5*
TN28	0(0)	4.09(4.09)	0(0)	F-5*
TV03	0.86(0)	9.23(0.96)	1.5(0.1)	D-2*
TV08	8.58(0.4)	11.76(0.95)	9.23(0.96)	D-1*
TV14	4.06(1.91)	11.78(0.44)	4.68(0.38)	D-1*
TV17	4.09(1.91)	5.2(5.2)	2.5(2.5)	C-1*
TV25	4.73(0.38)	11.76(0.96)	5.3(1.0)	D-1*
TV26	1.29(1.0)	5.3(1.0)	1.9(1.73)	D-1*
TV45	1.54(2.47)	0(0)	1.8(0.83)	E-2*
TV53	0(0)	0(3.0)	0(0)	E-2*
TV85	0(0)	2.86(0)	0(0)	F-5*
TV86	0(0)	0(0)	–	G-5*
TW03	2.3(2.39)	0(0)	1.22(1.22)	D-8*
TW11				G-9*
TW14	0.66(0.64)	0(0)	0(0)	G-7*
TW44	5.16(5.2)	11.6(11.68)	5.8(5.82)	F-7*
TW51	1.73(1.73)	11.6(11.67)	2.3(2.3)	C-5*
TW56	5.8(5.8)	11.8(11.8)	6.4(6.4)	C-3*
TW65	2.5(2.5)	11.75(11.7)	3.19(3.18)	D-6*
TW73	3.01(3.0)	11.6(11.6)	6.9(6.9)	C-7*
TW75	7.6(7.6)	3.5(3.6)	6.9(6.9)	C-7*
TW79	7.6(7.6)	6.9(6.9)	2.4(2.4)	C-7*
TW81	1.8(1.8)	11.6(11.6)	2.4(2.4)	C-8*
TW87	11.8(11.8)	11.8(0.06)	11.0(11.78)	D-5*
TW89	0(0)	0.04(11.7)	0.69(0)	D-7*
TW92	0.63(0.63)	0(0)	0.02(0.02)	E-6*
TX01	0.8(0.8)	7.8(7.8)	1.5(4.9)	C-6*
TX05	5.3(5.3)	5.29(5.29)	4.59(4.59)	D-6*
TX11	11.8(11.8)	11.7(0.96)	11.0(11.7)	E-8
TX12	0(0)	0.1(11.7)	0(0.7)	F-8*
TX16	0(0)	11.8(0.06)	0(0.7)	F-7*
TX17	11.8(11.8)	0(11.8)	11.7(0.1)	E-7
TX26	5.3(5.3)	5.29(5.29)	4.59(4.59)	E-8
TX27	0(0)	0.59(0.6)	0.74(0.75)	E-8*
TX28	11.76(11.78)	11.76(11.73)	11.12(11.12)	E-8
TX44	4.84(0.18)	11.74(11.74)	11.7(0)	D-9*
TX45	11.78(11.8)	0.02(0.02)	11.76(11.76)	D-10*

* shows on bottom side.

stands for V-413G only.

4-2. Key Display PCBoard

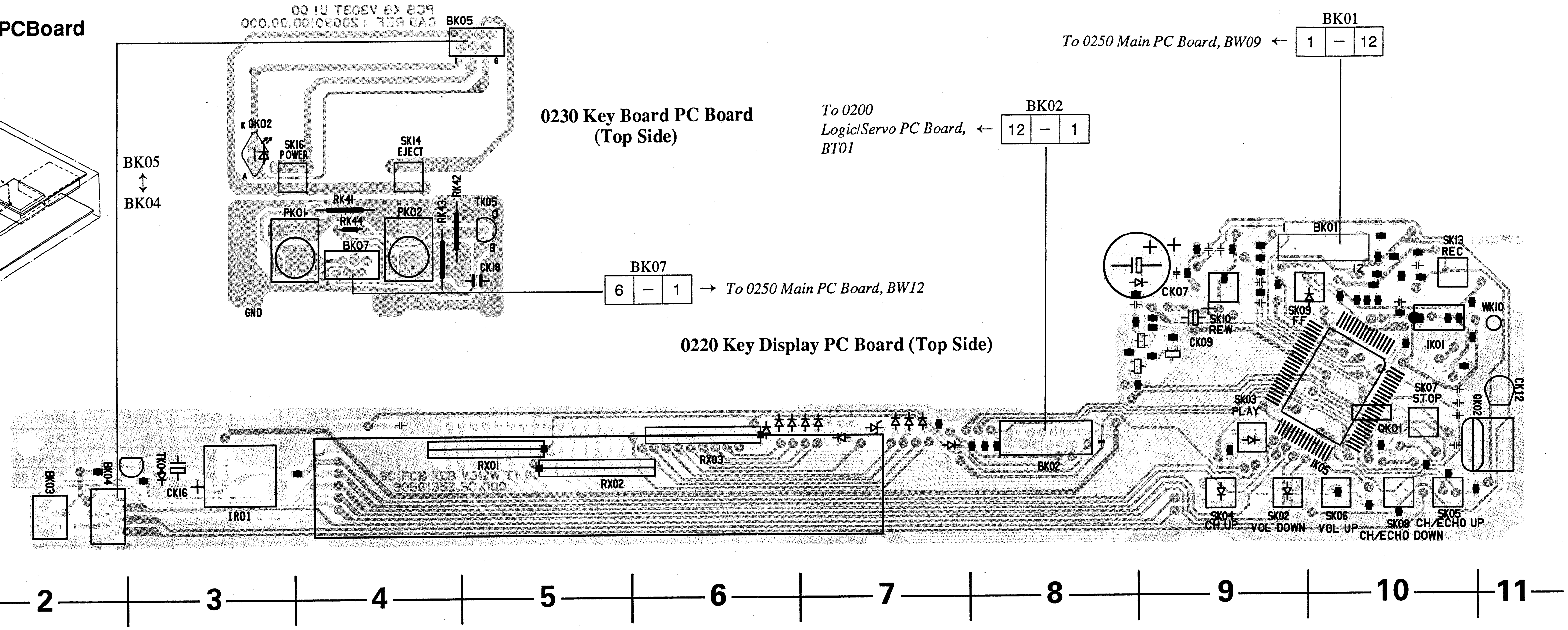


Location of ICs

Symbol No.	Loca-tion
IK01	B-10
IK05	A-10
IR01	A-3

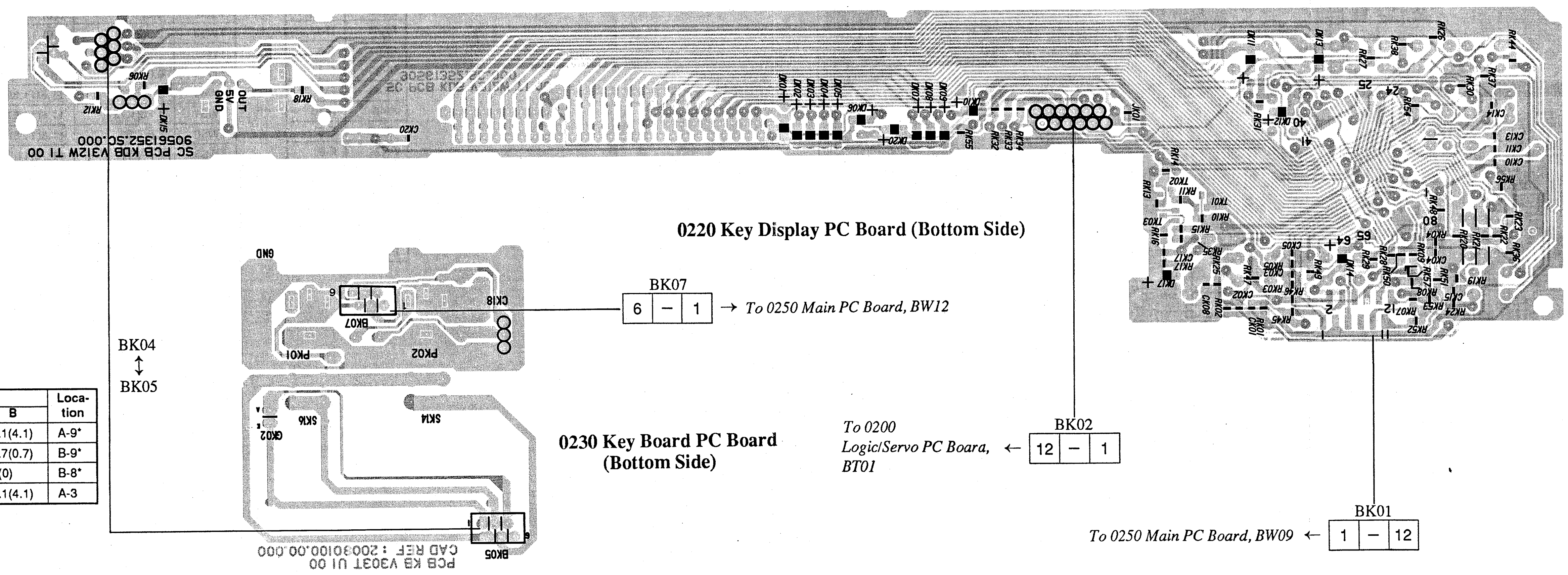
Location of Adjusting Part

Symbol No.	Loca-tion
CK12	A-11


D
C
B
A
PCB KB V303T U1 00
CAD REF : 20080100.00.000
BK05
GK02
SK16 POWER
SK14 EJECT
RK41
RK44
RK42
RK43
TK05
PK01
PK02
BK07
CK18
GND
BK05
↕
BK04
BK07
6 – 1
→ To 0250 Main PC Board, BW12
To 0200 Logic/Servo PC Board, BT01
BK02
12 – 1
To 0250 Main PC Board, BW09
BK01
1 – 12
BK01
SK13 REC
CK07
SK10 REW
CK09
SK09 FF
WK10
IK01
SK03 PLAY
SK07 STOP
CK12
QK02
QK01
IK05
SK04 CH UP
SK02 VOL DOWN
SK06 VOL UP
SK08 CH/ECHO DOWN
SK05 CH/ECHO UP
BK03
BK04
TK04
CK16
IR01
RX01
RX02
RX03
SC PCB KDB V312W T1 00
90561352.SC.000
BK02
1
2
3
4
5
6
7
8
9
10
11

0230 Key Board PC Board (Top Side)

0220 Key Display PC Board (Top Side)


A
B
C
D
SC PCB KDB V312W T1 00
90561352.SC.000
RK06
RK12
DK15
5V
GND
OUT
RK18
CX20
BK07
6 – 1
→ To 0250 Main PC Board, BW12
BK04
↕
BK05
GND
CK18
PK01
PK02
SK16
SK14
GK02
BK05
CAD REF : 20080100.00.000
PCB KB V303T U1 00
To 0200 Logic/Servo PC Boara, BT01
BK02
12 – 1
To 0250 Main PC Board, BW09
BK01
1 – 12

0220 Key Display PC Board (Bottom Side)

0230 Key Board PC Board (Bottom Side)

Location of Diodes

Symbol No.	Loca-tion
DK02	A-6*
DK03##	A-6*
DK08	A-7*
DK09#	A-7*
DK11	A-9*
DK12	A-9*
DK13	A-9*
DK14	B-10*
DK15	A-3*
DK17	B-8*
DK20	B-7*
GK02	C-3

Location of Transistors
V: (REC), (V): PLAY

Symbol No.	Voltage (Unit: V)			Loca-tion
	E	C	B	
TK01	4.9(4.9)	4.9(4.9)	4.1(4.1)	A-9*
TK02	–(0)	–(0)	0.7(0.7)	B-9*
TK03	0(0)	4.9(4.9)	0(0)	B-8*
TK04	3.9(3.9)	4.9(4.9)	4.1(4.1)	A-3

* shows on bottom side.
# stands for V-413G only.
# stands for V-403T only.

5. EXPL

The parts ident
The mounting
the same safety
All wires used
All connectors
All PC Board a

The part numb
description.
Parts marked #
However, whe
This parts list i

1. Integrated

2. Capacitor (

- **Unit**
  F...........
  MF........
  PF..........
- **Capacit**

To

To

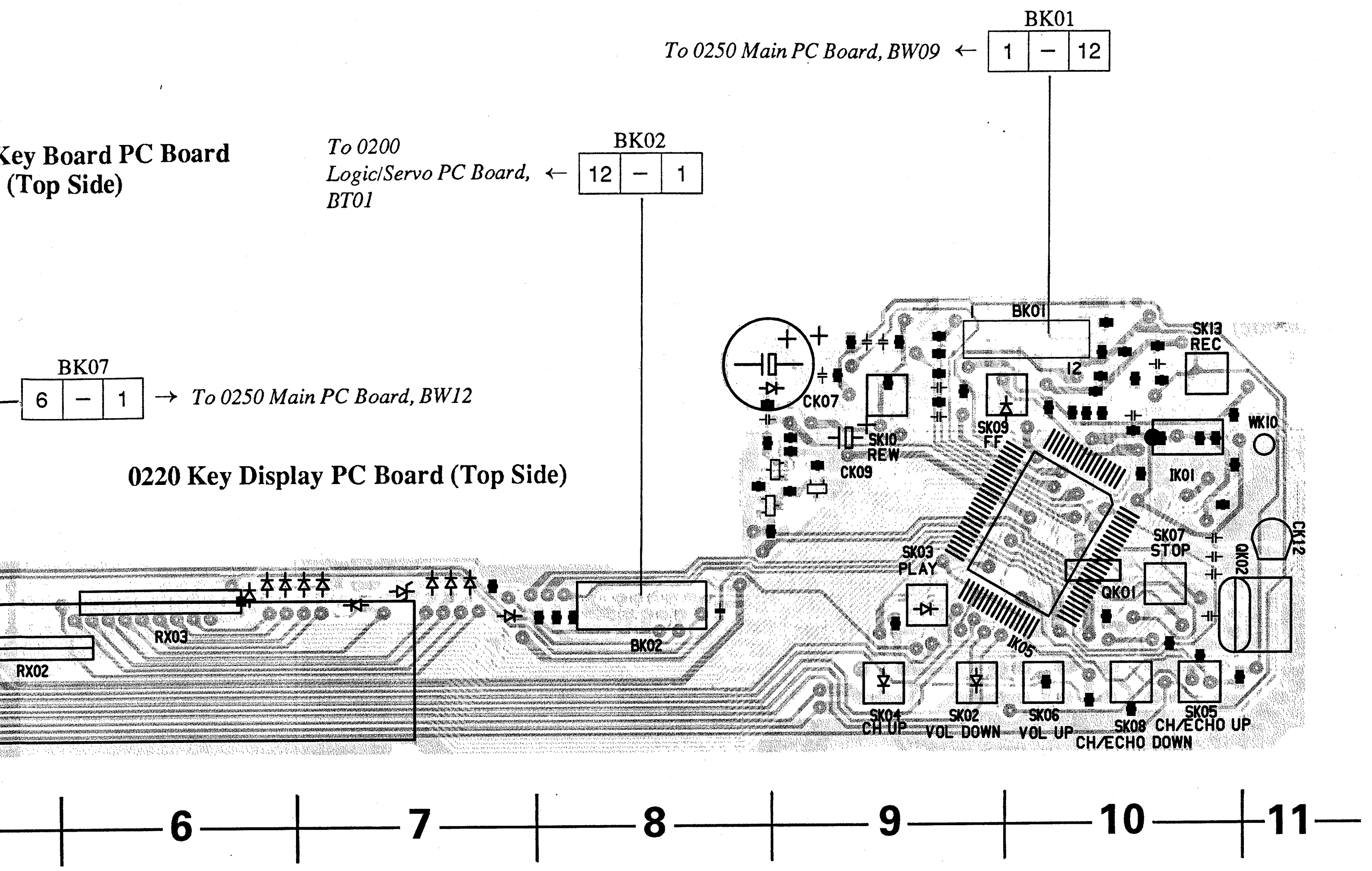
- **Capacit**

Sy
Tole

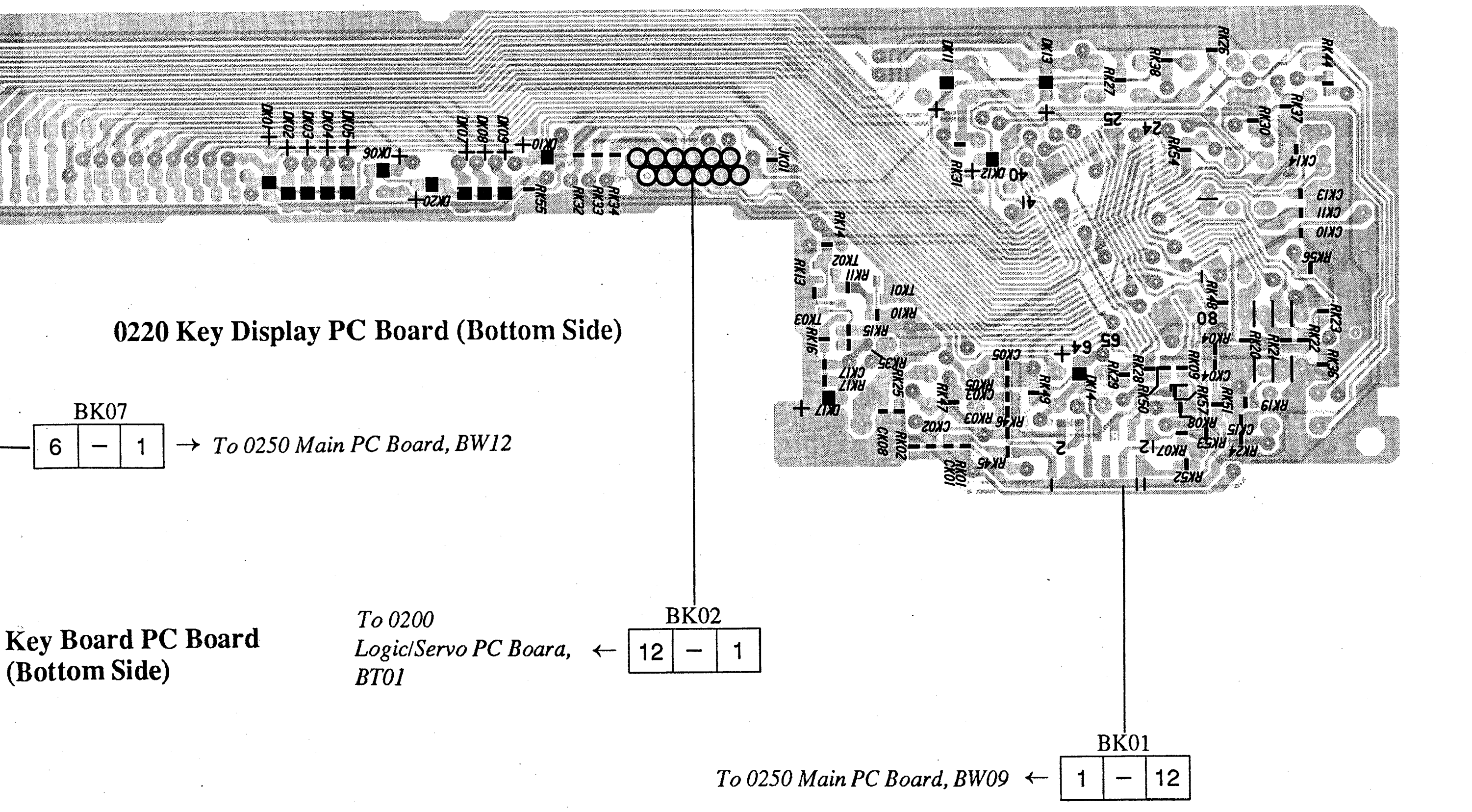
3. Resistor (R

- **Unit**
  No Mark
  K..........
  M..........
  W ....
- **Resistar**

S
Tol


BK01
To 0250 Main PC Board, BW09 ← 1 – 12
ey Board PC Board
(Top Side)
To 0200
Logic/Servo PC Board, ← 12 – 1
BT01
BK02
BK07
6 – 1 → To 0250 Main PC Board, BW12
BK01
12
SK13
REC
WK10
CK12
QK02
IK01
CK07
SK10
REW
CK09
SK09
FF
SK07
STOP
SK03
PLAY
QK01
IK05
BK02
RX03
RX02
SK04
CH UP
SK02
VOL DOWN
SK06
VOL UP
SK08
CH/ECHO DOWN
SK05
CH/ECHO UP
6
7
8
9
10
11

0220 Key Display PC Board (Top Side)


BK07
6 – 1 → To 0250 Main PC Board, BW12
Key Board PC Board
(Bottom Side)
To 0200
Logic/Servo PC Boara, ← 12 – 1
BT01
BK02
BK01
To 0250 Main PC Board, BW09 ← 1 – 12

0220 Key Display PC Board (Bottom Side)

5. EXPLODED VIEWS AND PARTS LIST

SAFETY PRECAUTION

The parts identified by ⚠ mark are critical for safety. Replace only with part number specified.
The mounting position of replacement is to be identical with originals. The substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.
All wires used must be UL recognized wires.
All connectors used must have a minimum rating of 94V-2.
All PC Board assemblies are safety parts.

NOTICE

The part number must be used when ordering parts in order to assist in processing, be sure to include the model number and description.
Parts marked # are of chip type and mounted on original PC boards.
However, when they are placed for servicing works, use discrete parts listed on the parts list.
This parts list is based on the model V-403T. For V-413G, different parts only are listed on the difference list.

ABBREVIATIONS

1. Integrated circuit (IC)

2. Capacitor (Cap)

- **Unit**

		Ex.
F	farad	
MF	microfarad (mF = 10^{-6}F)	10MF = 10mF
PF	picofarad (pF = 10^{-6}mF = 10^{-12}F)	10PF = 10pF

- **Capacitance tolerance (for nominal capacitance higher than 10pF)**

Symbol	B	C	D	F	G	J	K	M	N
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10	± 20	± 30

Symbol	P	Q	T	U	V	W	X	Y	Z
Tolerance %	+ 100 0	+ 30 –10	+ 50 –10	+ 75 –10	+ 20 –10	+ 100 –10	+ 40 –20	+ 150 –10	+ 80 –20

Ex. 10MF J = 10µF ± 5%

- **Capacitance tolerance (for nominal capacitance lower than 10pF)**

Symbol	B	C	D	F	G
Tolerance pF	± 0.1	± 0.25	± 0.5	± 1	± 2

Ex. 10PF G = 10pF ± 2pF

3. Resistor (Res)

- **Unit**

		Ex.	
No Mark	W	10	10W
K	kW	10K	10kW
M	MW	10M	10MW
W	Watt	1W	1 Watt

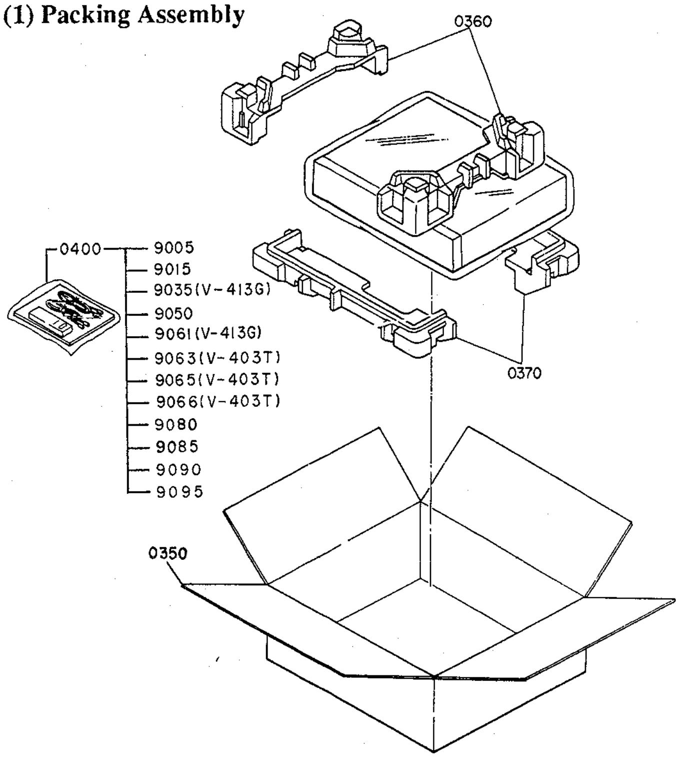
- **Resistance tolerance**

Symbol	B	C	D	F	G	J	K	M
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10	± 20

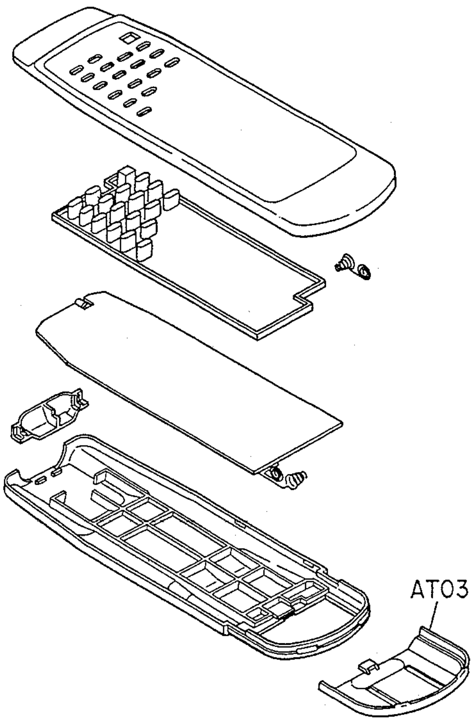
Ex. 470 J = 470Ω ± 5%

5-1. Exploded Views

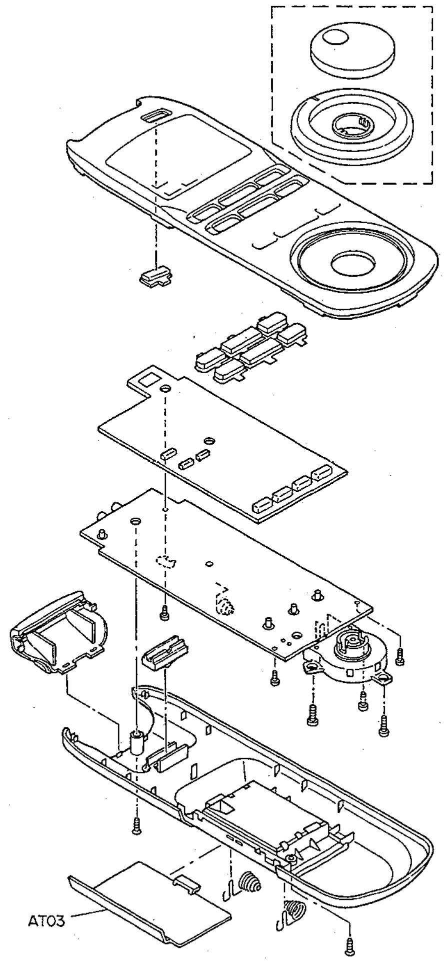
(1) Packing Assembly


0360
0400
9005
9015
9035(V-413G)
9050
9061(V-413G)
9063(V-403T)
9065(V-403T)
9066(V-403T)
9080
9085
9090
9095
0370
0350

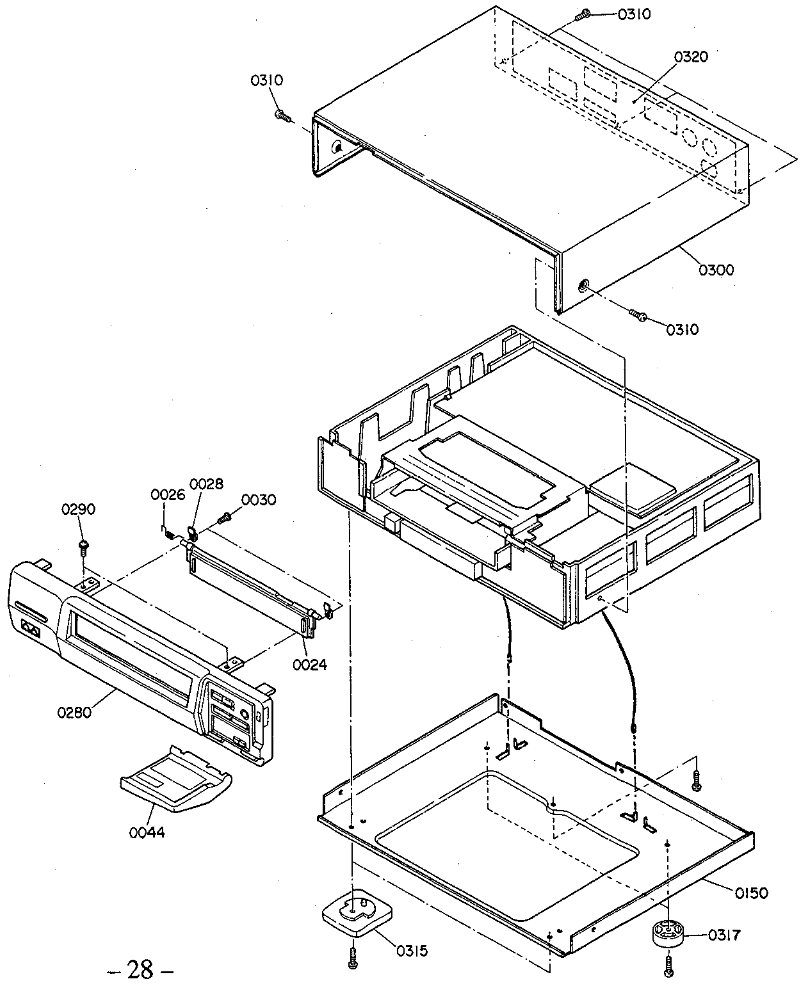
(2) Remote Control Unit (V-403T)



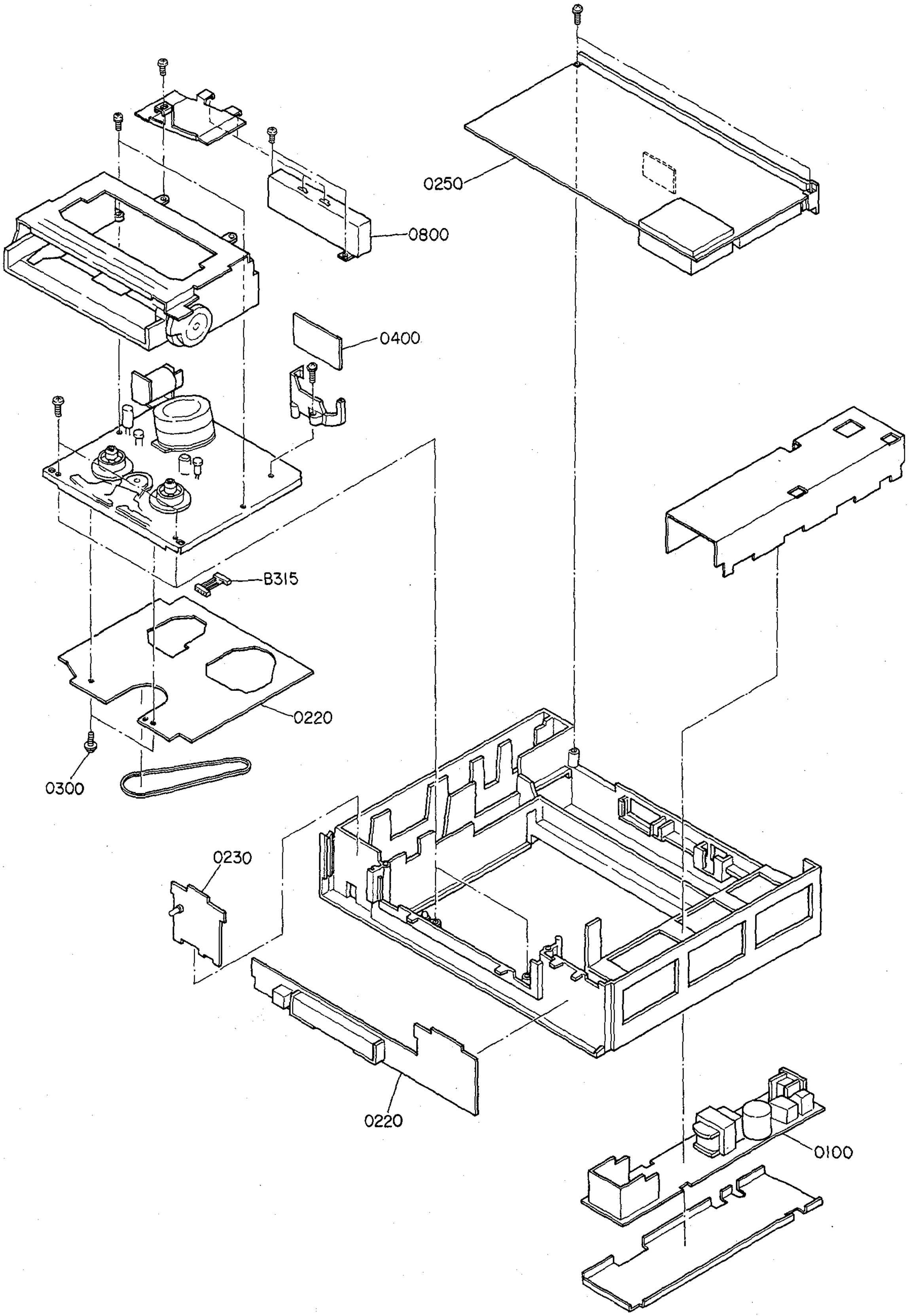
(3) Remote Control Unit (V-413G)



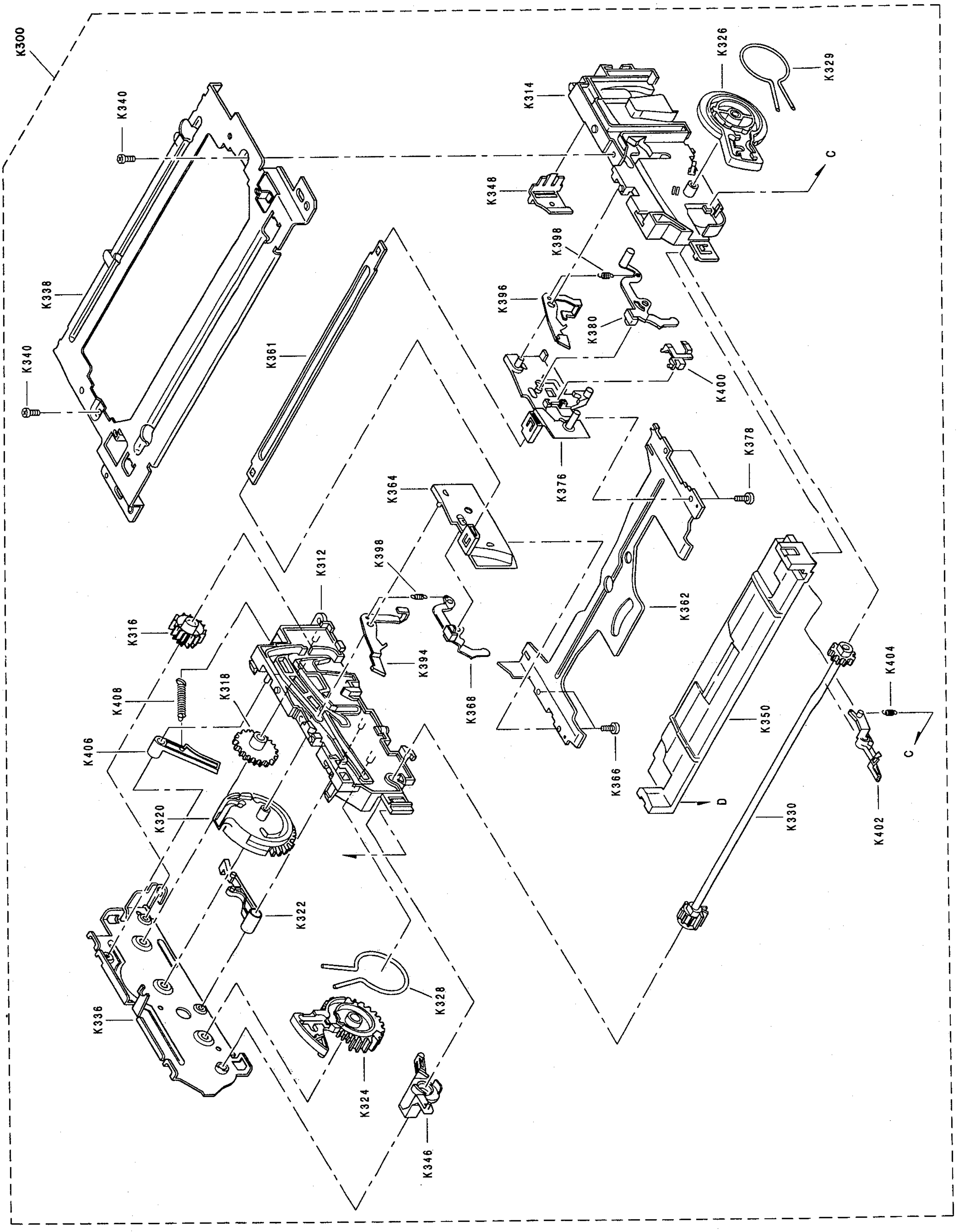
(4) Cabinet Assembly


0310
0320
0310
0300
0310
0026
0028
0030
0290
0024
0280
0044
0150
0315
0317

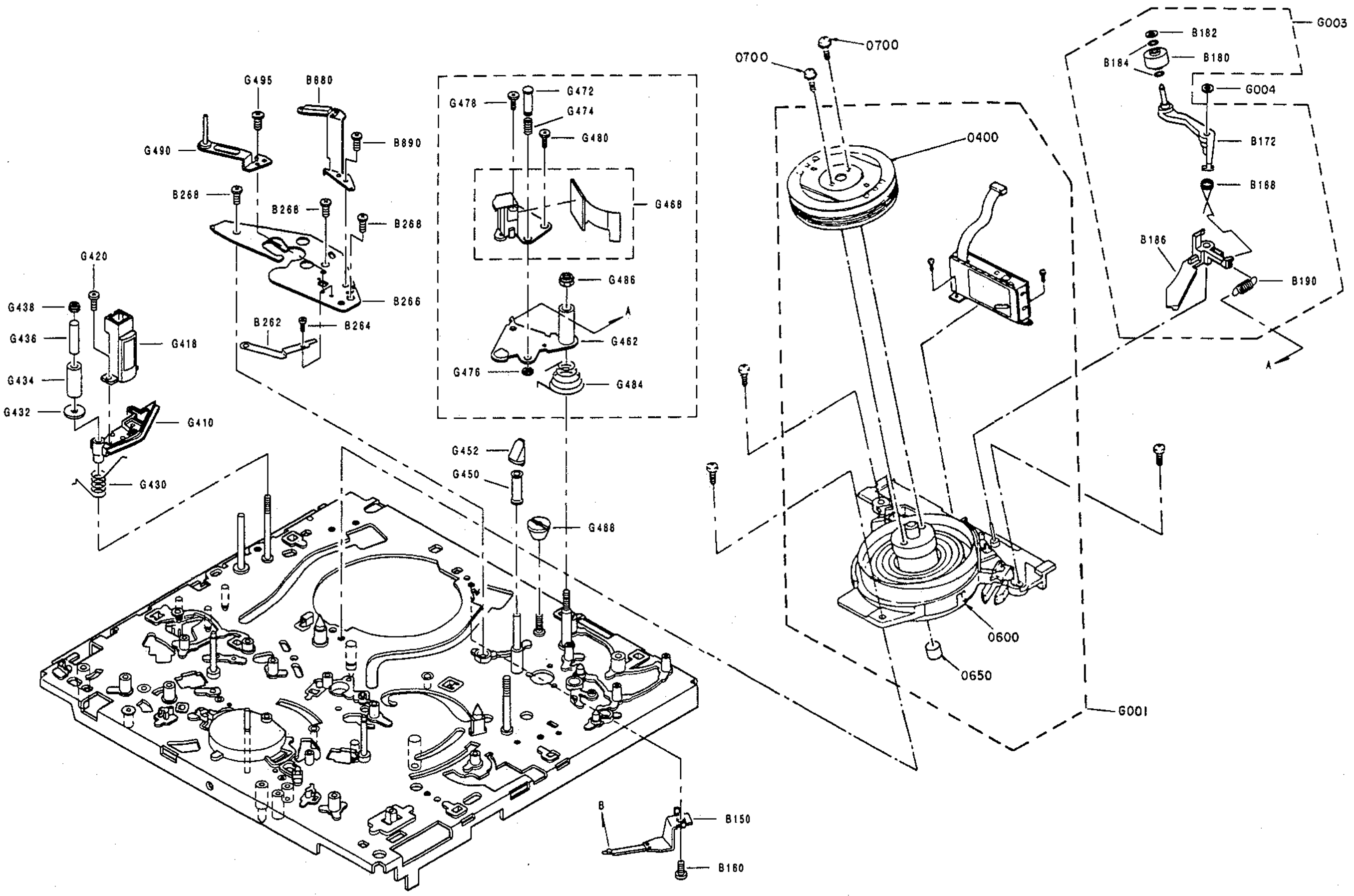
(5) Chassis Assembly


0250
0800
0400
B315
0220
0300
0230
0220
0100

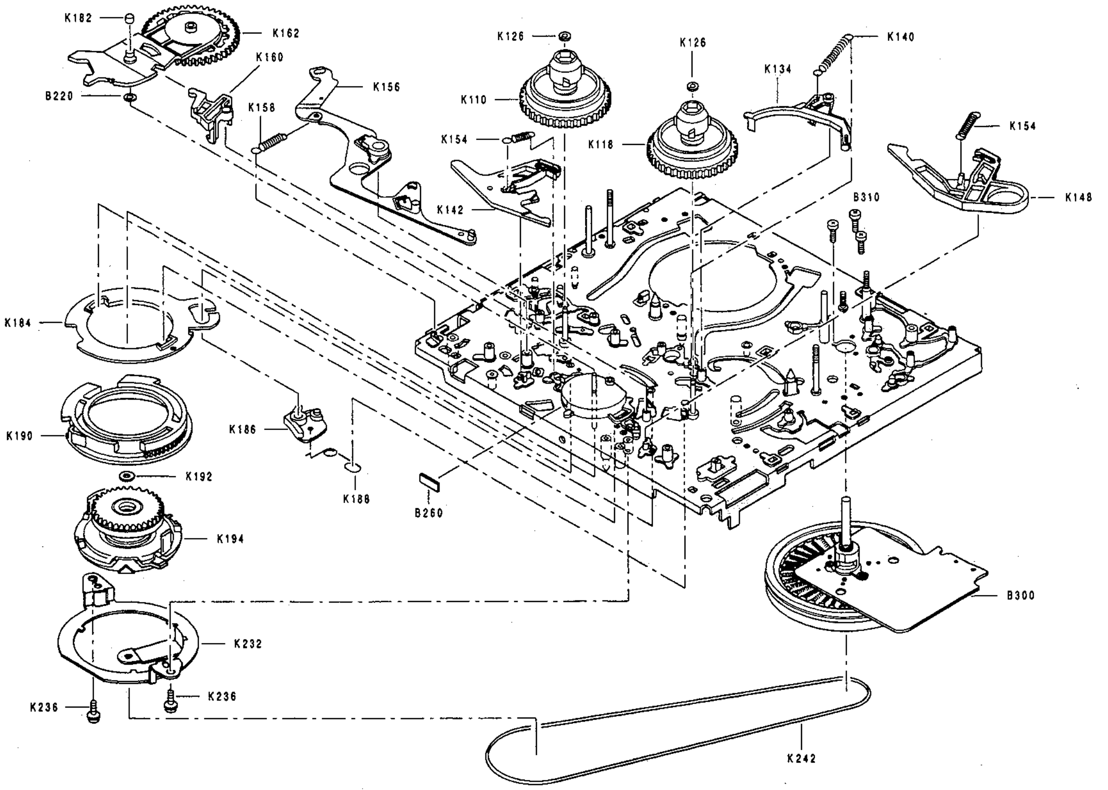
(6) Cassette Holder Assembly


K300
K340
K338
K340
K361
K364
K312
K316
K408
K406
K318
K320
K322
K336
K328
K324
K346
K314
K326
K329
C
K348
K398
K396
K380
K400
K376
K378
K362
K398
K394
K368
K366
K350
D
K404
C
K402
K330

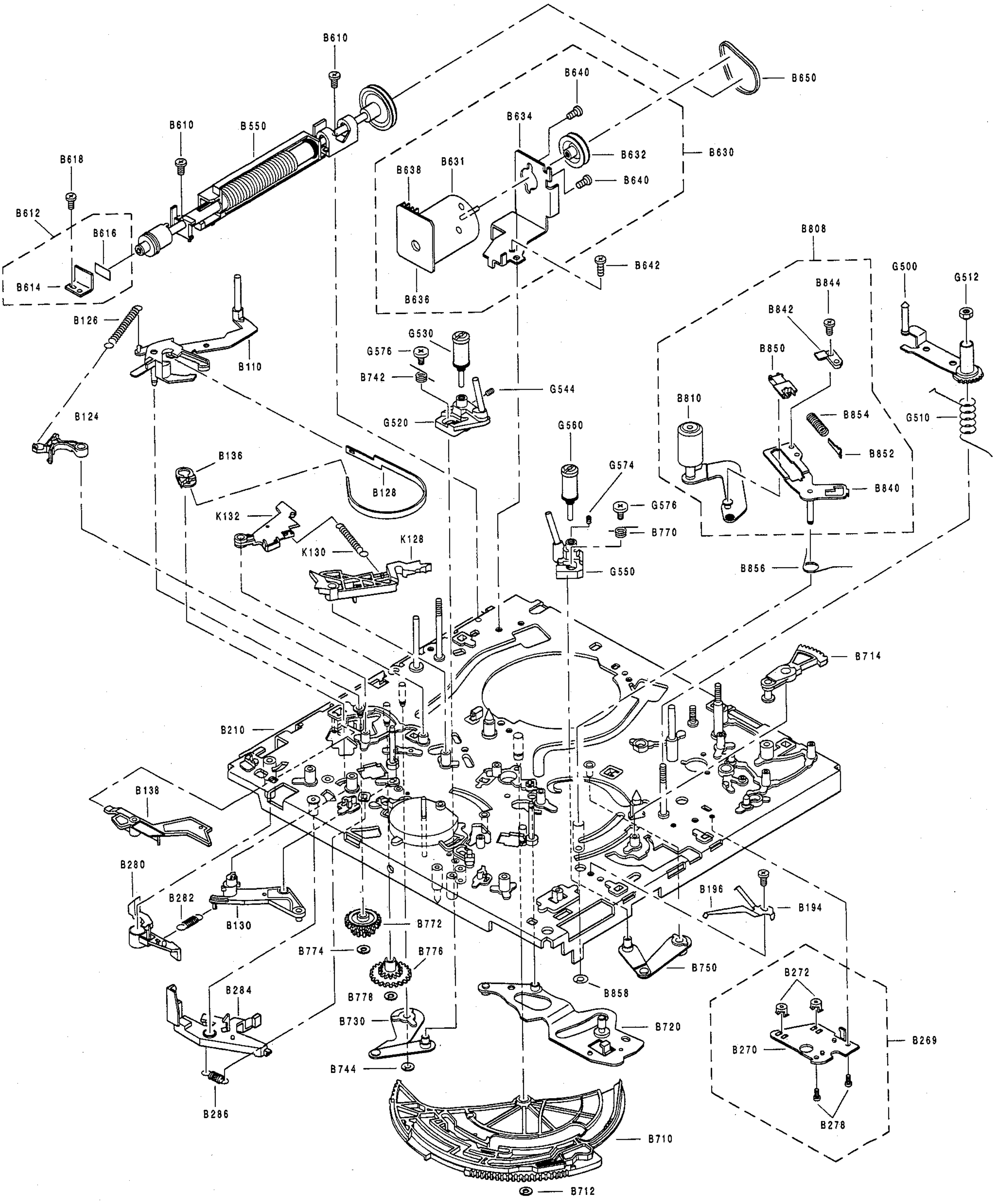
(7) Mechanical Parts (1)


G495
B880
G490
B890
B268
B268
B268
B266
G420
G438
G436
G418
G434
G432
G410
G430
B262
B264
G478
G472
G474
G480
G468
G486
A
G462
G476
G484
G452
G450
G488
0700
0700
0400
B182
B184
B180
G003
G004
B172
B168
B186
B190
A
0600
0650
G001
B
B150
B160

(8) Mechanical Parts (2)


K182
K162
K160
K156
B220
K158
K126
K126
K140
K134
K110
K154
K118
K154
K142
B310
K148
K184
K186
K190
K192
K188
B260
K194
B300
K232
K236
K236
K242

(9) Mechanical Parts (3)


B610
B640
B650
B634
B610
B550
B632
B630
B618
B638
B631
B640
B612
B616
B614
B636
B642
B808
G500
G512
B844
B126
B842
G530
B110
G576
B850
B742
G544
B810
B854
G510
B124
G520
G560
B852
B136
G574
B840
B128
G576
K132
B770
K128
K130
G550
B856
B714
B210
B138
B280
B196
B194
B282
B130
B772
B774
B776
B750
B272
B284
B778
B858
B730
B720
B269
B270
B744
B286
B710
B278
B712

5-2. PARTS LIST

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
		- MECHANICAL PARTS -	
0005	70050139	Screw	2.0x6.0mm
0024	70050888	Cassette Door	
0026	70356258	Spring	
0030	70050139	Screw	2.0x6.0mm
0034	70393022	Nut	
0044	70050890	Door Assy	
⚠0150	70050711	Bottom Cover	
⚠0180	70050713	Shield Cover	
0280	70050884	Front Panel	
0290	70391440	Screw	3x10mm
1-0300	70070025	Screw	2.6x6mm
⚠2-0300	70050597	Top Cover	
0315	70050902	Insulator Assy(Front)	
0317	70050490	Insulator Assy(Rear)	
0350	70060705	Case	
0360	70060441	Packing Top	
0370	70060442	Packing Bottom	
0400	70031040	Upper Cylinder Assy	
0500	70070025	Screw	2.6x6mm
0600	70031102	Lower Cylinder Base Assy	
0650	70050599	Earth Cap Assy	
0700	70030438	Screw	3x10mm
0900	70030656	Screw	2.6x5mm
⚠9005	70060751	Owners Manual, I/S	
9050	70060070	Caution Sheet	
9063	70060744	Quick Reference(Italian)	
9065	70060743	Quick Reference(English)	
9066	70060745	Quick Reference(Spanish)	
9085	70011432	Remote Control Unit	
⚠9095	70010354	Mains Cord	
B110	70011000	Tension Arm Assy	
B124	70030975	Tension Lever	
B126	70050643	Spring	
B128	70011075	Band Brake Assy	
B130	70030976	Band Brake Lever Assy	
B136	70011143	Band Holder	
B138	70011050	Drive Mode Slider	
B150	70011117	Ground Brush Assy	
B160	70031067	Screw	3x3mm
B172	70030991	Lever Assy	
B174	70030999	Lever	
B182	70070050	Washer	4.0x1.6x0.35
B184	70070065	Washer	3.9x2.1x0.25
B196	70031067	Screw	3x3mm
B264	70070059	Screw	2x3mm
B268	70070060	Screw	2.6x6mm
B278	70070049	Screw	2.6x4mm
B280	70030969	F/L Lever	
B282	70050630	Spring	
B284	70030981	REC Inhibit Lever	
B286	70050633	Spring	
B300	70011046	Capstan Motor Assy	
B310	70031084	Screw	
B550	70011060	Drive Shaft Assy	
B584	70070026	Washer	5.4x3.1x0.5mm
B610	70070060	Screw	2.6x6mm
B612	70011026	Plate Stopper Assy	
B618	70070064	Screw	2.6x3mm
B630	70011062	Drive Motor Assy	
B642	70050708	Screw	3x4mm
B650	70011007	Drive Belt	
B710	70011445	Cam Gear	
B712	70070063	Washer	6.0x3.1x0.5mm
B714	70011088	OSC Drive Assy	
B719	70070058	Washer	4.0x2.1x0.35
B720	70011137	P OSC Drive Assy	
B730	70011076	S Load Link Assy	
B742	70050622	Spring	
B744	70050709	Washer	6.0x2.6
B750	70011127	T Load Link Assy	
B770	70050647	Spring	
B772	70050680	A Mode Drive Gear	
B774	70070058	Washer	4.0x2.1x0.35
B776	70050745	Gear	
B778	70070058	Washer	4.0x2.1x0.35
B808	70011252	Pinch Lever Assy	
B856	70050652	Spring	
B858	70070022	Washer	2.6x5x0.5mm
B880	70011082	Cap	
B890	70070052	Screw	2x4mm
G001	70031110	Cylinder Assy	
G003	70011036	Head Cleaner Assy	
G004	70070050	Washer	4.0x1.6x0.35
G410	70031068	Lever	
G418	70030633	FE Head	
G420	70070028	Screw	2.6x6mm
G430	70050649	Spring	
G432	70011130	Flange	
G434	70011131	Guide Roller	
G436	70011101	Guide Sleeve	
G438	70011160	Nut	M2.6x3
G450	70030388	Guide Sleeve	
G462	70011165	ACE Main Base Sub Assy	
G468	70011166	ACE Sub Base Assy	
G472	70030178	Shaft	
G474	70030250	Spring	
G476	70070015	E Ring	
G478	70070011	Screw	3x0.5x8mm
G480	70030251	Adjust Screw	
G484	70050640	Spring	
G486	70011160	Nut	M2.6x3
G490	70011248	NO.10 Guide Assy	
G500	70011056	OSC Guide	
G510	70050635	Spring	
G512	70011023	Nut	
G520	70011154	Slider Assy	
G530	70011155	S Roller Assy	
G544	70070039	Screw	2x3mm
G550	70011089	T Slider Assy	
G560	70011139	T Roller Assy	
G574	70070039	Screw	2x3mm
G576	70011068	Stopper	
K110	70011021	S Reel Disk Assy	
K118	70011149	T Reel Disk Assy	
K126	70070008	Washer	1.6x0.35mm
K128	70030989	S Soft Brake Lever	
K130	70050632	Spring	
K132	70031000	S Slide Lock Lever	
K134	70031001	T Soft Lever Assy	
K136	70030983	T Soft Brake Lever	
K140	70050623	Spring	
K142	70031003	S Brake Lever Assy	
K148	70031004	T Brake Lever Assy	
K154	70050634	Spring	
K156	70030994	Main Brake Charge Lever	
K158	70050629	Spring	
K160	70030988	Idle Arm Lever	
K162	70011106	Idle Arm Assy	
K182	70011121	Idle Arm Cap	
K190	70011120	Clutch Cam	
K192	70011054	Washer	
K194	70011104	Clutch Assy	
K236	70070061	Screw	2.6x10mm
K242	70011111	Reel Belt	
K300	70011126	Front Loading Assy	
K316	70050675	Worm Wheel T Gear	
K318	70050668	Relay Gear	
K320	70050673	F/L Cam Gear	
K324	70050676	Arm Gear L	
K326	70050681	Arm Gear R	
K330	70050603	Drive Shaft Assy	
K340	70070062	Screw	3x6mm
K346	70030990	Door Lever	
K402	70030998	Door Lock Lever	
K404	70050641	Spring	

LOCATION NUMBER	PART NUMBER	DESCRIPTION
		DIFFERENCE LIST
V413G		
0024	70051071	Cassette Door
0280	70050950	Front Panel
0290	72471082	Screw, 3x10mm
0315	70050945	Insulator Assy(Front)
0350	70060776	Case
⚠9005	70060808	Owners Manual, German
9061	70060802	Quick Reference(German)
9063	--------	Not Used
9065	--------	Not Used
9066	--------	Not Used
9085	70011431	Remote Control Unit
⚠9095	70011387	Mains Cord

LOCATION NUMBER	PART NUMBER	DESCRIPTION

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
		- ELECTRICAL PARTS -		
■0200	70090180	P C Board Assy	Logic/Servo	
		- INTEGRATED CIRCUITS -		
IT01	70011329	IC	ST9030AP	
IT25	70010977	IC	U2559B	
IT40	70010979	IC	U2565B	
IT50	70010984	IC	74HC14	
IT60	70010975	IC	L2726	
		- TRANSISTORS -		
TL01	70010131	Transistor	BC337-40	
TT101	70010331	Transistor	BC847B	
TT12	70010331	Transistor	BC847B	
TT14	70010181	Transistor	PT493F	
TT15	70010181	Transistor	PT493F	
TT25	70010331	Transistor	BC847B	
TT26	70010131	Transistor	BC337-40	
TT30	70010331	Transistor	BC847B	
TT40	70010332	Transistor	BC857B	
TT41	70010945	Transistor	BCX19	
TT79	70010331	Transistor	BC847B	
TT80	70010331	Transistor	BC847B	
TT81	70010332	Transistor	BC857B	
TT82	70010332	Transistor	BC857B	
TT95	70010949	Transistor	BC858	
		- DIODES -		
DT30	70010342	Diode, Chip	LL4148	
DT31	70010342	Diode, Chip	LL4148	
DT32	70010342	Diode, Chip	LL4148	
DT51	70010342	Diode, Chip	LL4148	
DT52	70010342	Diode, Chip	LL4148	
DT54	70010342	Diode, Chip	LL4148	
DT56	70010342	Diode, Chip	LL4148	
DT58	70010342	Diode, Chip	LL4148	
		- COILS -		
LL01	70011369	Transformer		
LT01	70010927	Coil, Peaking		
		- CAPACITORS -		
CL03	24630850	Cap, Electrolytic	47MF	M 16V
CL04	70040988	Cap, Chip	1NF	M 25V
CL05	70040997	Cap, Chip	10NF	M 25V
CL06	70041054	Cap, Electrolytic	1MF	M 50V
CL07	70041223	Cap, Plastic	56NF	J 100V
CT01	70040730	Cap, Chip	100NF	M 25V
CT02	70040730	Cap, Chip	100NF	M 25V
CT03	70041026	Cap, Chip	1NF	M 50V
CT04	70040730	Cap, Chip	100NF	M 25V
CT05	24815471	Cap, Chip	470PF	K 50V
CT06	24815471	Cap, Chip	470PF	K 50V
CT07	70040984	Cap, Chip	10NF	K 25V
CT08	70041026	Cap, Chip	1NF	M 50V
CT100	70041026	Cap, Chip	1NF	M 50V
CT16	70041026	Cap, Chip	1NF	M 50V
CT17	70041026	Cap, Chip	1NF	M 50V
CT24	70041026	Cap, Chip	1NF	M 50V
CT26	70041113	Cap, Electrolytic	47MF	M 16V
CT27	70040730	Cap, Chip	100NF	M 25V
CT28	70041038	Cap, Electrolytic	10MF	M 16V
CT29	70040628	Cap, Plastic	150NF	J 63V
CT30	70041038	Cap, Electrolytic	10MF	M 16V
CT31	70041029	Cap, Plastic	33NF	J 63V
CT34	70041037	Cap, Electrolytic	47MF	M 16V
CT35	70041014	Cap, Chip	2.2NF	K 50V
CT36	70041039	Cap, Electrolytic	22MF	M 16V
CT37	70041037	Cap, Electrolytic	47MF	M 16V
CT38	24815471	Cap, Chip	470PF	K 50V
CT39	70041026	Cap, Chip	1NF	M 50V
CT41	70041054	Cap, Electrolytic	1MF	M 50V
CT42	70041113	Cap, Electrolytic	47MF	M 16V
CT43	70040730	Cap, Chip	100NF	M 25V
CT50	70040730	Cap, Chip	100NF	M 25V
CT51	70041021	Cap, Chip	22PF	J 50V
CT53	70041037	Cap, Electrolytic	47MF	M 16V
CT54	70041021	Cap, Chip	22PF	J 50V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CT57	70041037	Cap, Electrolytic	47MF	M 16V
CT61	70040730	Cap, Chip	100NF	M 25V
CT63	70040988	Cap, Chip	1NF	M 25V
CT64	70040730	Cap, Chip	100NF	M 25V
CT66	70041021	Cap, Chip	22PF	J 50V
CT67	70041021	Cap, Chip	22PF	J 50V
CT94	70040730	Cap, Chip	100NF	M 25V
CT95	70041026	Cap, Chip	1NF	M 50V
CT96	70041026	Cap, Chip	1NF	M 50V
		- RESISTORS -		
RL01	24871479	Res, Chip	4.7	J 1/8W
⚠RL02	70041075	Res, Fusible	18	J
RL03	24872333	Res, Chip	33K	J 1/16W
RL04	24872183	Rcs, Chip	18K	J 1/16W
RT01	24871102	Res, Chip	1K	J 1/8W
RT02	24871102	Res, Chip	1K	J 1/8W
RT03	24871102	Res, Chip	1K	J 1/8W
RT04	24871103	Res, Chip	10K	J 1/8W
RT05	24871100	Res, Chip	10	J 1/8W
RT08	24872103	Res, Chip	10K	J 1/16W
RT09	24872103	Res, Chip	10K	J 1/16W
RT10	24871472	Res, Chip	4.7K	J 1/8W
RT100	24872682	Res, Chip	6.8K	J 1/16W
RT101	24872103	Res, Chip	10K	J 1/16W
RT102	24872563	Res, Chip	56K	J 1/16W
RT103	24871153	Res, Chip	15K	J 1/8W
RT104	24872103	Res, Chip	10K	J 1/16W
RT105	24872331	Res, Chip	330	J 1/16W
RT106	24871331	Res, Chip	330	J 1/8W
RT13	24872103	Res, Chip	10K	J 1/16W
RT14	24871273	Res, Chip	27K	J 1/8W
RT15	24872223	Res, Chip	22K	J 1/16W
RT16	24871562	Res, Chip	5.6K	J 1/8W
RT17	24871562	Res, Chip	5.6K	J 1/8W
RT19	24872221	Res, Chip	220	J 1/16W
RT20	24871472	Res, Chip	4.7K	J 1/8W
RT21	24872562	Res, Chip	5.6K	J 1/16W
RT22	24871331	Res, Chip	330	J 1/8W
RT23	24871562	Res, Chip	5.6K	J 1/8W
RT24	24871822	Res, Chip	8.2K	J 1/8W
RT25	24872392	Res, Chip	3.9K	J 1/16W
RT26	24872331	Res, Chip	330	J 1/16W
RT27	24872223	Res, Chip	22K	J 1/16W
RT28	24871223	Res, Chip	22K	J 1/8W
RT29	24871222	Res, Chip	2.2K	J 1/8W
RT30	24872101	Res, Chip	100	J 1/16W
RT31	24872273	Res, Chip	27K	J 1/16W
RT32	24872153	Res, Chip	15K	J 1/16W
RT33	24872273	Res, Chip	27K	J 1/16W
RT34	24872682	Res, Chip	6.8K	J 1/16W
RT35	24872472	Res, Chip	4.7K	J 1/16W
RT36	24872222	Res, Chip	2.2K	J 1/16W
RT37	24872683	Res, Chip	68K	J 1/16W
RT38	24872472	Res, Chip	4.7K	J 1/16W
RT39	24872391	Res, Chip	390	J 1/16W
RT40	24872101	Res, Chip	100	J 1/16W
RT41	24871474	Res, Chip	470K	J 1/8W
RT42	24871103	Res, Chip	10K	J 1/8W
RT43	24872183	Res, Chip	18K	J 1/16W
RT44	24872103	Res, Chip	10K	J 1/16W
RT45	24871153	Res, Chip	15K	J 1/8W
RT46	24871103	Res, Chip	10K	J 1/8W
RT47	24872472	Res, Chip	4.7K	J 1/16W
RT48	24871561	Res, Chip	560	J 1/8W
RT49	70041135	Res, Chip	6.2K	F 1/10W
RT50	24872103	Res, Chip	10K	J 1/16W
RT51	24872474	Res, Chip	470K	J 1/16W
RT52	24872101	Res, Chip	100	J 1/16W
RT53	24872223	Res, Chip	22K	J 1/16W
RT54	24872474	Res, Chip	470K	J 1/16W
RT55	70041134	Res, Chip	4.7K	F 1/10W
RT56	24872101	Res, Chip	100	J 1/16W
RT57	24872223	Res, Chip	22K	J 1/16W
RT58	24872103	Res, Chip	10K	J 1/16W
RT59	24872123	Res, Chip	12K	J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RT61	24871183	Res, Chip	18K	J 1/8W
RT63	24871103	Res, Chip	10K	J 1/8W
RT65	24872103	Res, Chip	10K	J 1/16W
RT66	24872103	Res, Chip	10K	J 1/16W
RT68	24872221	Res, Chip	220	J 1/16W
RT69	24871103	Res, Chip	10K	J 1/8W
RT72	24871103	Res, Chip	10K	J 1/8W
RT75	24872103	Res, Chip	10K	J 1/16W
RT78	24872682	Res, Chip	6. 8K	J 1/16W
RT79	24872103	Res, Chip	10K	J 1/16W
RT80	24871103	Res, Chip	10K	J 1/8W
RT81	24871103	Res, Chip	10K	J 1/8W
RT82	24872103	Res, Chip	10K	J 1/16W
RT83	24871102	Res, Chip	1K	J 1/8W
RT84	24872102	Res, Chip	1K	J 1/16W
RT85	24872562	Res, Chip	5. 6K	J 1/16W
RT87	24872102	Res, Chip	1K	J 1/16W
RT88	24872102	Res, Chip	1K	J 1/16W
RT90	24872121	Res, Chip	120	J 1/16W
RT91	24872471	Res, Chip	470	J 1/16W
RT92	24872104	Res, Chip	100K	J 1/16W
RT93	24872104	Res, Chip	100K	J 1/16W
RT95	24872105	Res, Chip	1M	J 1/16W
RT96	24871474	Res, Chip	470K	J 1/8W
RT97	24872103	Res, Chip	10K	J 1/16W
RT98	24872103	Res, Chip	10K	J 1/16W
RT99	24871103	Res, Chip	10K	J 1/8W
J101	70041093	Chip Jumper		
J105	70041093	Chip Jumper		
J106	70041093	Chip Jumper		
J107	70041093	Chip Jumper		
J108	70041096	Chip Jumper		
J109	70041096	Chip Jumper		
J110	70041093	Chip Jumper		
J111	70041093	Chip Jumper		
J112	70041093	Chip Jumper		
J113	70041096	Chip Jumper		
J115	70041093	Chip Jumper		
J116	70041093	Chip Jumper		
J117	70041093	Chip Jumper		
J120	70041096	Chip Jumper		
J121	70041093	Chip Jumper		
J122	70041093	Chip Jumper		
J123	70041093	Chip Jumper		
J125	70041096	Chip Jumper		
J126	70041096	Chip Jumper		
J127	70041096	Chip Jumper		
J128	70041096	Chip Jumper		
J129	70041096	Chip Jumper		
J132	70041096	Chip Jumper		
J137	70041093	Chip Jumper		
		- MISCELLANEOUS -		
GT18	70010180	Diode		
GT19	70010961	Photo Interrupter	TCST5123	
GT22	70010960	Photo Interrupter	TCST5133	
GT23	70010961	Photo Interrupter	TCST5123	
GT26	70010960	Photo Interrupter	TCST5133	
QT66	70010934	Crystal	24MHz	
ST04	70070029	Push Switch		
ST71	70070029	Push Switch		
■0400	70090179	P C Board Assy	Audio	
		- INTEGRATED CIRCUITS -		
I010	70010976	IC	LA7282M	
		- TRANSISTORS -		
T031	70010150	Transistor	BC848B	
		- COILS -		
L024	70010921	Coil, Peaking		
		- CAPACITORS -		
C001	70040096	Cap, Ceramic	470PF	M 400V
C011	70040247	Cap, Ceramic, Chip	1NF	J 50V
C013	24591103	Cap, Plastic	0. 01MF	J 50V
C014	70041037	Cap, Electrolytic	47MF	M 16V
C015	70040730	Cap, Chip	100NF	M 25V
C016	24633220	Cap, Electrolytic	22MF	M 16V
C017	24092293	Cap, Chip	0. 1MF	Z 25V
C018	70041065	Cap, Chip	100PF	K 50V
C022	70041039	Cap, Electrolytic	22MF	M 16V
C023	70041053	Cap, Electrolytic	4. 7MF	M 35V
C024	70041036	Cap, Plastic	10NF	G 63V
C025	70041024	Cap, Chip	33NF	K 50V
C027	70040607	Cap, Electrolytic	10MF	M 16V
C028	70040269	Cap, Ceramic, Chip	47NF	Z 50V
C029	70040493	Cap, Chip	10NF	K 50V
C030	70040493	Cap, Chip	10NF	K 50V
C040	70041200	Cap, Plastic	22NF	J 63V
		- RESISTORS -		
R003	24872393	Res, Chip	39K	J 1/16W
R010	24872100	Res, Chip	10	J 1/16W
R011	24872333	Res, Chip	33K	J 1/16W
R012	24872334	Res, Chip	330K	J 1/16W
R013	24872103	Res, Chip	10K	J 1/16W
R014	24872470	Res, Chip	47	J 1/16W
R016	70041273	Res, Chip	2	J
R017	24872683	Res, Chip	68K	J 1/16W
R019	24871103	Res, Chip	10K	J 1/8W
R021	70040358	Res, Chip	10K	J 1/16W
R023	24871223	Res, Chip	22K	J 1/8W
R024	24871471	Res, Chip	470	J 1/8W
R025	24872271	Res, Chip	270	J 1/16W
R026	24872622	Res, Chip	6. 2K	J 1/16W
R027	70041175	Res, Chip	24K	J 5W
R028	70040348	Res, Chip	100	J 1/16W
R031	24872224	Res, Chip	220K	J 1/16W
R032	24871473	Res, Chip	47K	J 1/8W
R033	24871103	Res, Chip	10K	J 1/8W
JY01	70041096	Chip Jumper		
JY02	70041096	Chip Jumper		
JY03	70041096	Chip Jumper		
JY04	70041096	Chip Jumper		
JY05	70041093	Chip Jumper		
JY06	70041096	Chip Jumper		
P001	70041099	Res, Variable	100	N
P013	70041100	Res, Variable	10K	N
■0800	70090185	P C Board Assy	Pre Amp	
		- INTEGRATED CIRCUITS -		
IQ01	70010978	IC	TEA5706	
		- TRANSISTORS -		
TQ37	70010947	Transistor	BC858	
TQ41	70010150	Transistor	BC848B	
TQ46	70010947	Transistor	BC858	
		- DIODES -		
DQ01	70010340	Diode	1SS181	
DQ02	70010340	Diode	1SS181	
		- COILS -		
LQ02	70010490	Coil, Peaking		
LQ35	70011220	Coil, Peaking		
		- CAPACITORS -		
CQ01	70041023	Cap, Chip	22NF	M 50V
CQ02	70040721	Cap, Electrolytic	22MF	M 16V
CQ03	70040989	Cap, Chip	10NF	K 50V
CQ04	70040978	Cap, Chip	18PF	J 50V
CQ05	70040978	Cap, Chip	18PF	J 50V
CQ06	70040991	Cap, Chip	4. 7NF	M 50V
CQ07	70040991	Cap, Chip	4. 7NF	M 50V
CQ08	70040989	Cap, Chip	10NF	K 50V
CQ09	70040989	Cap, Chip	10NF	K 50V
CQ10	70040989	Cap, Chip	10NF	K 50V
CQ11	70041017	Cap, Chip	470PF	K 50V
CQ12	70041011	Cap, Chip	10PF	J 50V
CQ13	70040978	Cap, Chip	18PF	J 50V
CQ14	70041017	Cap, Chip	470PF	K 50V
CQ15	70040991	Cap, Chip	4. 7NF	M 50V
CQ16	70040991	Cap, Chip	4. 7NF	M 50V
CQ17	70041007	Cap, Chip	22NF	M 25V
CQ21	70041023	Cap, Chip	22NF	M 50V
CQ26	70041007	Cap, Chip	22NF	M 25V
CQ28	70041023	Cap, Chip	22NF	M 50V
CQ29	24774470	Cap, Chip	47PF	J 50V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CQ30	70041016	Cap, Chip	47PF	J 50V
CQ31	24815102	Cap, Chip	1000PF	K 50V
CQ34	70041108	Cap, Chip	10NF	M 50V
CQ35	70041111	Cap, Electrolytic	470MF	M 10V
CQ36	70041108	Cap, Chip	10NF	M 50V
CQ40	70040524	Cap, Electrolytic	22MF	X 10V
CQ41	70040992	Cap, Chip	470NF	Z 25V
		- RESISTORS -		
RQ11	24871431	Res, Chip	430	J 1/8W
RQ14	70041095	Res, Chip	360	J
RQ21	24872392	Res, Chip	3.9K	J 1/16W
RQ22	24872202	Res, Chip	2K	J 1/16W
RQ23	24872182	Res, Chip	1.8K	J 1/16W
RQ24	24872392	Res, Chip	3.9K	J 1/16W
RQ25	24872150	Res, Chip	15	J 1/16W
RQ29	24872472	Res, Chip	4.7K	J 1/16W
RQ30	24872472	Res, Chip	4.7K	J 1/16W
RQ32	24872820	Res, Chip	82	J 1/16W
RQ33	24871102	Res, Chip	1K	J 1/8W
RQ34	70041096	Chip Jumper		
RQ36	24872102	Res, Chip	1K	J 1/16W
RQ37	24872101	Res, Chip	100	J 1/16W
RQ40	24872332	Res, Chip	3.3K	J 1/16W
RQ41	24872331	Res, Chip	330	J 1/16W
RQ42	24872183	Res, Chip	18K	J 1/16W
RQ43	24872103	Res, Chip	10K	J 1/16W
RQ44	24872472	Res, Chip	4.7K	J 1/16W
RQ45	24872102	Res, Chip	1K	J 1/16W
RQ46	24872183	Res, Chip	18K	J 1/16W
RQ47	24872822	Res, Chip	8.2K	J 1/16W
RQ48	24872470	Res, Chip	47	J 1/16W
JQ01	70041093	Chip Jumper		
JQ03	70041096	Chip Jumper		
JQ04	70041093	Chip Jumper		
JQ06	70041093	Chip Jumper		
JQ08	70041093	Chip Jumper		
JQ09	70041093	Chip Jumper		
JQ10	70041093	Chip Jumper		
JQ12	70041093	Chip Jumper		
JQ13	70041093	Chip Jumper		
JQ14	70041093	Chip Jumper		
JQ15	70041093	Chip Jumper		
JQ16	70041093	Chip Jumper		
■0100	70090267	P C Board Assy	Power	
		- TRANSISTORS -		
TP01	70010949	Transistor	BC858	
TP02	70010946	Transistor	BC848	
TP03	70010949	Transistor	BC858	
TP04	70010949	Transistor	BC858	
TP05	70010946	Transistor	BC848	
TP06	70010942	Transistor	BC848	
TP07	70011386	Transistor	2SA1020-Y	
TP08	70011385	Transistor	TE02537F	
TP71	70010149	Transistor	BD435	
TP711	70010538	Spring Clip		
TP72	70010942	Transistor	BC848	
TP73	70010942	Transistor	BC848	
TP74	70010942	Transistor	BC848	
TP81	70010148	Transistor	BD434	
TP82	70010332	Transistor	BC857B	
TP83	70011386	Transistor	2SA1020-Y	
TP86	70010148	Transistor	BD434	
TP861	70010538	Spring Clip		
TP87	70010144	Transistor	BC548C	
TP91	70011386	Transistor	2SA1020-Y	
TP92	70010952	Transistor	BC817-40	
TP93	70010949	Transistor	BC858	
		- DIODES -		
DP01	70010956	Diode	1N4007	
DP02	70010956	Diode	1N4007	
DP03	70010956	Diode	1N4007	
DP04	70010956	Diode	1N4007	
DP06	70010957	Diode, Zener	ZPD10	
DP07	70010342	Diode, Chip	LL4148	

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
DP08	70010958	Diode, Zener	ZPD6.2	
DP09	70010342	Diode, Chip	LL4148	
DP11	70010342	Diode, Chip	LL4148	
DP12	70010153	Diode	1N4148	
DP13	70011286	Diode, Zener	ZPD5.6	
DP14	70041093	Chip Jumper		
DP15	70011367	Diode, Zener	ZPD3.9	
DP16	70010153	Diode	1N4148	
DP31	70010453	Diode	1N4001	
DP32	70010453	Diode	1N4001	
DP41	70010450	Diode	BA157	
DP51	70010817	Diode	1N4148	
DP61	70010953	Diode	BYV28-150	
DP71	70010954	Diode	BA158	
DP74	70010618	Diode, Zener	6V8	
DP81	70010456	Diode	1N5822	
DP82	70010456	Diode	1N5822	
DP86	70011395	Diode, Zener	10V	
DP90	70010450	Diode	BA157	
DP91	70010953	Diode	BYV28-150	
DP92	70010953	Diode	BYV28-150	
DP93	70010153	Diode	1N4148	
DP94	70010959	Diode, Zener	ZPD10	
DP95	70010955	Diode	MUR115	
DP96	70010450	Diode	BA157	
DP97	70010965	Diode	LL4448	
DP98	70010965	Diode	LL4448	
		- COILS -		
LP011	70010916	Filter		
⚠LP02	70010915	Filter		
⚠LP20	70010914	Power Transformer		
LP51	70010922	Coil, Peaking		
LP61	70010925	Coil, Peaking		
LP71	70010922	Coil, Peaking		
LP81	70010925	Coil, Peaking		
LP91	70010925	Coil, Peaking		
		- CAPACITORS -		
⚠CP01	70040056	Cap, Plastic	100NF	M 275V
CP02	70041047	Cap, Electrolytic	47MF	M 385V
CP03	70041033	Cap, Plastic	56NF	M 63V
⚠CP04	70041057	Cap, Ceramic	2.2NF	M 40V
CP05	24636010	Cap, Electrolytic	1MF	M 50V
CP06	24636010	Cap, Electrolytic	1MF	M 50V
CP07	24636010	Cap, Electrolytic	1MF	M 50V
CP08	70041035	Cap, Plastic	2.2NF	M 10V
CP09	70040052	Cap, Plastic	100NF	M 63V
CP10	24797100	Cap, Electrolytic	10MF	M 50V
CP11	70041061	Cap, Ceramic	330PF	M 3KV
CP12	70041015	Cap, Chip	10NF	M 50V
CP13	70041149	Cap, Plastic	10NF	J 63V
CP14	70040986	Cap, Chip	180PF	K 50V
CP15	70041148	Cap, Chip	22NF	K 50V
CP16	70041110	Cap, Plastic	330NF	J 63V
CP41	24792471	Cap, Electrolytic	470MF	M 6.3V
CP50	70041062	Cap, Ceramic	180PF	K 40V
CP51	24797100	Cap, Electrolytic	10MF	M 50V
CP52	70040421	Cap, Electrolytic	220MF	M 35V
CP60	70041060	Cap, Ceramic	68PF	J 400V
CP61	70041056	Cap, Electrolytic	820MF	M 25V
CP62	70041046	Cap, Electrolytic	1000MF	X 25V
CP71	70040772	Cap, Electrolytic	47MF	M 50V
CP72	70041112	Cap, Electrolytic	100MF	X 50V
CP73	70041031	Cap, Plastic	10NF	M 10V
CP81	70041049	Cap, Electrolytic	1000MF	M 16V
CP82	70041045	Cap, Electrolytic	1000MF	X
CP83	70040725	Cap, Electrolytic	100	M 25V
CP90	70040408	Cap, Plastic	22NF	K 250V
CP91	70040227	Cap, Ceramic, Chip	1NF	J 50V
CP92	70041048	Cap, Electrolytic	1200MF	M 16V
CP93	70041040	Cap, Electrolytic	1000MF	X 16V
CP94	70040272	Cap, Ceramic, Chip	680PF	J 50V
		- RESISTORS -		
RP04	24871184	Res, Chip	180K	J 1/8W
RP06	24871184	Res, Chip	180K	J 1/8W
RP07	24871184	Res, Chip	180K	J 1/8W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RP08	24871331	Res,Chip	330	J 1/8W
RP09	24871101	Res,Chip	100	J 1/8W
RP10	24871472	Res,Chip	4.7K	J 1/8W
RP11	24871472	Res,Chip	4.7K	J 1/8W
RP12	24871103	Res,Chip	10K	J 1/8W
RP13	24871181	Res,Chip	180	J 1/8W
RP14	24871229	Res,Chip	2.2	J 1/8W
RP15	24871821	Res,Chip	820	J 1/8W
RP16	24871332	Res,Chip	3.3K	J 1/8W
RP17	24871102	Res,Chip	1K	J 1/8W
RP18	24871103	Res,Chip	10K	J 1/8W
RP19	24871392	Res,Chip	3.9K	J 1/8W
RP20	24871689	Res,Chip	6.8	J 1/8W
RP21	70041072	Res,Carbon	120	J 0.7W
RP22	24871563	Res,Chip	56K	J 1/8W
RP23	24871332	Res,Chip	3.3K	J 1/8W
RP24	24871123	Res,Chip	12K	J 1/8W
RP26	24871103	Res,Chip	10K	J 1/8W
RP27	24871473	Res,Chip	47K	J 1/8W
RP28	24871332	Res,Chip	3.3K	J 1/8W
RP29	70041150	Res,Chip	13	J
RP30	24871562	Res,Chip	5.6K	J 1/8W
RP31	24871473	Res,Chip	47K	J 1/8W
RP32	24871562	Res,Chip	5.6K	J 1/8W
RP33	70039007	Res,Oxide Metal	1.5	J 1.5W
⚠RP41	70041081	Res,Fusible	0.1	F 0.4W
RP46	24871103	Res,Chip	10K	J 1/8W
RP47	24871103	Res,Chip	10K	J 1/8W
⚠RP51	70041077	Res,Fusible	8.2	J 0.3W
RP61	24871822	Res,Chip	8.2K	J 1/8W
RP62	24871822	Res,Chip	8.2K	J 1/8W
RP63	24871822	Res,Chip	8.2K	J 1/8W
RP64	24871822	Res,Chip	8.2K	J 1/8W
RP65	24871822	Res,Chip	8.2K	J 1/8W
⚠RP66	70041081	Res,Fusible	0.1	F 0.4W
RP70	70040101	Res,Carbon	680	J
⚠RP71	70041073	Res,Fusible	22	J 0.3W
RP72	24871183	Res,Chip	18K	J 1/8W
RP73	24871183	Res,Chip	18K	J 1/8W
RP74	24871183	Res,Chip	18K	J 1/8W
RP75	24871121	Res,Chip	120	J 1/8W
RP76	70041070	Res,Carbon	220	J 1/4W
RP77	24871102	Res,Chip	1K	J 1/8W
RP78	70041082	Res,Oxide Metal	150	J 2W
RP79	24871562	Res,Chip	5.6K	J 1/8W
RP80	24871103	Res,Chip	10K	J 1/8W
RP81	24366101	Res,Carbon	100	J 1/6W
RP82	24871103	Res,Chip	10K	J 1/8W
RP83	24871121	Res,Chip	120	J 1/8W
RP84	24871121	Res,Chip	120	J 1/8W
RP85	24871121	Res,Chip	120	J 1/8W
⚠RP86	70041074	Res,Fusible	27	J 0.3W
RP87	70041090	Res,Chip	4.64K	F
RP88	24871151	Res,Chip	150	J 1/8W
RP89	70041147	Res,Metal	392	F 0.4W
RP90	70041084	Res,Wire Wound	68	J 5W
⚠RP91	70041078	Res,Fusible	1.5	J 0.3W
⚠RP92	70041076	Res,Fusible	470	J 0.3W
RP93	24871472	Res,Chip	4.7K	J 1/8W
RP94	24871681	Res,Chip	680	J 1/8W
RP95	24871222	Res,Chip	2.2K	J 1/8W
RP96	24871821	Res,Chip	820	J 1/8W
RP97	24871302	Res,Chip	3K	J 1/8W
RP98	70041085	Res,Chip	3.32K	F
RP99	70041091	Res,Chip	1K	F 0.4W
JP20	70041093	Chip Jumper		
JP21	70041093	Chip Jumper		
PP91	70041146	Res,Variable	2.2K	
		- MISCELLANEOUS -		
⚠FP01	70010445	Fuse,1A,250V		
FP011	70010207	Fuse Holder		
⚠FP02	70010515	Fuse	0.63A,250V	
■0220	70090280	P C Board Assy	Key Display	
		- INTEGRATED CIRCUITS -		
IK01	70010974	IC	TC89101P	
IR01	70011443	F.U.	IR-9106A-D	
		- TRANSISTORS -		
TK01	70010947	Transistor	BC858	
TK02	70010150	Transistor	BC848B	
TK03	70010150	Transistor	BC848B	
TK04	70010134	Transistor	BC548B	
		- DIODES -		
DK02	70010342	Diode,Chip	LL4148	
DK03	70010342	Diode,Chip	LL4148	
DK08	70010342	Diode,Chip	LL4148	
DK11	70010342	Diode,Chip	LL4148	
DK12	70010342	Diode,Chip	LL4148	
DK13	70010342	Diode,Chip	LL4148	
DK14	70010342	Diode,Chip	LL4148	
DK15	70010342	Diode,Chip	LL4148	
DK17	70010342	Diode,Chip	LL4148	
DK20	70010962	Diode,Zener	ZMM2.7	
		- CAPACITORS -		
CK01	24783101	Cap,Chip	100PF	J 50V
CK02	24783101	Cap,Chip	100PF	J 50V
CK03	24783101	Cap,Chip	100PF	J 50V
CK04	24783101	Cap,Chip	100PF	J 50V
CK05	24783101	Cap,Chip	100PF	J 50V
CK07	70041066	Cap	0.1F	Z
CK08	24815223	Cap,Chip	0.022MF	K 50V
CK09	24203470	Cap,Electrolytic	47MF	M 16V
CK10	24774569	Cap,Chip	5.6PF	
CK11	24774150	Cap,Chip	15PF	J 50V
CK12	70041027	Cap,Variable		100V
CK13	24774330	Cap,Chip	33PF	J 50V
CK14	24774330	Cap,Chip	33PF	J 50V
CK15	70040493	Cap,Chip	10NF	K 50V
CK16	24793101	Cap,Electrolytic	100MF	M 10V
CK17	70040493	Cap,Chip	10NF	K 50V
CK20	24815223	Cap,Chip	0.022MF	K 50V
		- RESISTORS -		
RK01	24872103	Res,Chip	10K	J 1/16W
RK02	24872332	Res,Chip	3.3K	J 1/16W
RK03	24872103	Res,Chip	10K	J 1/16W
RK04	24872332	Res,Chip	3.3K	J 1/16W
RK05	24872103	Res,Chip	10K	J 1/16W
RK06	24872103	Res,Chip	10K	J 1/16W
RK07	24872472	Res,Chip	4.7K	J 1/16W
RK08	24872103	Res,Chip	10K	J 1/16W
RK09	24872103	Res,Chip	10K	J 1/16W
RK10	24872472	Res,Chip	4.7K	J 1/16W
RK11	24872102	Res,Chip	1K	J 1/16W
RK12	24872221	Res,Chip	220	J 1/16W
RK13	24872683	Res,Chip	68K	J 1/16W
RK14	24872683	Res,Chip	68K	J 1/16W
RK15	24872223	Res,Chip	22K	J 1/16W
RK16	24872102	Res,Chip	1K	J 1/16W
RK17	24872222	Res,Chip	2.2K	J 1/16W
RK18	24872223	Res,Chip	22K	J 1/16W
RK19	24872103	Res,Chip	10K	J 1/16W
RK20	24872472	Res,Chip	4.7K	J 1/16W
RK21	24872472	Res,Chip	4.7K	J 1/16W
RK22	24872472	Res,Chip	4.7K	J 1/16W
RK23	24872472	Res,Chip	4.7K	J 1/16W
RK24	24872103	Res,Chip	10K	J 1/16W
RK25	24872103	Res,Chip	10K	J 1/16W
RK26	24872103	Res,Chip	10K	J 1/16W
RK27	24872103	Res,Chip	10K	J 1/16W
RK28	24872223	Res,Chip	22K	J 1/16W
RK29	24872223	Res,Chip	22K	J 1/16W
RK30	24872223	Res,Chip	22K	J 1/16W
RK31	24872223	Res,Chip	22K	J 1/16W
RK32	24872221	Res,Chip	220	J 1/16W
RK33	24872221	Res,Chip	220	J 1/16W
RK34	24872221	Res,Chip	220	J 1/16W
RK35	24872221	Res,Chip	220	J 1/16W
RK36	24872103	Res,Chip	10K	J 1/16W
RK37	24872103	Res,Chip	10K	J 1/16W
RK38	24872103	Res,Chip	10K	J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RK44	24872472	Res, Chip	4.7K	J 1/16W
RK45	24872221	Res, Chip	220	J 1/16W
RK46	24872221	Res, Chip	220	J 1/16W
RK47	24872221	Res, Chip	220	J 1/16W
RK48	24872221	Res, Chip	220	J 1/16W
RK49	24872221	Res, Chip	220	J 1/16W
RK50	24872221	Res, Chip	220	J 1/16W
RK51	24872221	Res, Chip	220	J 1/16W
RK52	24872392	Res, Chip	3.9K	J 1/16W
RK53	24872221	Res, Chip	220	J 1/16W
RK54	24872221	Res, Chip	220	J 1/16W
RK55	24872562	Res, Chip	5.6K	J 1/16W
RK56	24872153	Res, Chip	15K	J 1/16W
RK57	24872221	Res, Chip	220	J 1/16W
		- MISCELLANEOUS -		
GK01	70011497	FIP	7-BT-183GK	
QK01	70010116	Crystal, 32KHz		
QK02	70010937	Resonator	8MHz	
SK03	23145394	Push Switch, 1C1P		
SK05	23145394	Push Switch, 1C1P		
SK07	23145394	Push Switch, 1C1P		
SK08	23145394	Push Switch, 1C1P		
SK09	23145394	Push Switch, 1C1P		
SK10	23145394	Push Switch, 1C1P		
SK13	23145394	Push Switch, 1C1P		
■0230	70090281	P C Board Assy	Key Board	
		- MISCELLANEOUS -		
GK02	A8605671	Diode, LED	TLG113A(FA)	
PK01	70060757	Phono Jack		
PK02	70060759	Phono Jack		
SK14	23145394	Push Switch, 1C1P		
SK16	23145394	Push Switch, 1C1P		
■0250	70090287	P C Board Assy	Main	
		- INTEGRATED CIRCUITS -		
IA01	70010967	IC	TDA8128	
IA40	70011505	IC	M35011	
IF21	70010172	IC	MSM7401RS	
II40	70010531	IC	TDA5930	
IN01	70010966	IC	AN3248NK	
IN15	70010982	IC	74HC00	
IN16	70010983	IC	74HC74	
IS50	70010968	IC	LA7051	
IV40	70010971	IC	TA8757AN	
IW28	70010664	IC	HEF4053BT	
IW35	70010970	IC	TBA120T	
IW60	70010664	IC	HEF4053BT	
IW65	70010980	IC	HEF4052BT	
		- TRANSISTORS -		
TA46	70010150	Transistor	BC848B	
TA91	A6004010	Transistor, Chip	RN1401	
TC48	70010942	Transistor	BC848	
TF02	70010150	Transistor	BC848B	
TF06	70010150	Transistor	BC848B	
TF09	70010947	Transistor	BC858	
TF26	70010150	Transistor	BC848B	
TF30	70010150	Transistor	BC848B	
TF33	70010150	Transistor	BC848B	
TF41	70010150	Transistor	BC848B	
TF45	70010942	Transistor	BC848	
TI10	70011393	Transistor, Chip	MMBTH10LT1	
TI101	70010521	Transistor	BF799	
TN01	70010947	Transistor	BC858	
TN03	70010150	Transistor	BC848B	
TN28	70010150	Transistor	BC848B	
TV03	70010150	Transistor	BC848B	
TV08	70010150	Transistor	BC848B	
TV14	70010150	Transistor	BC848B	
TV17	70010150	Transistor	BC848B	
TV25	70010150	Transistor	BC848B	
TV26	70010150	Transistor	BC848B	
TV45	70010947	Transistor	BC858	
TV53	70010150	Transistor	BC848B	
TV85	70010150	Transistor	BC848B	

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
TV86	70010150	Transistor	BC848B	
TW03	70010947	Transistor	BC858	
TW11	70010150	Transistor	BC848B	
TW14	70010949	Transistor	BC858	
TW44	70010150	Transistor	BC848B	
TW51	70010942	Transistor	BC848	
TW56	70010944	Transistor	BC847	
TW65	70010150	Transistor	BC848B	
TW73	70010331	Transistor	BC847B	
TW75	70010332	Transistor	BC857B	
TW79	70010332	Transistor	BC857B	
TW81	70010944	Transistor	BC847	
TW87	70010947	Transistor	BC858	
TW89	70010942	Transistor	BC848	
TW92	70010949	Transistor	BC858	
TX01	70010150	Transistor	BC848B	
TX05	70010947	Transistor	BC858	
TX11	70010142	Transistor	BC327-40	
TX12	70010150	Transistor	BC848B	
TX16	70010150	Transistor	BC848B	
TX17	70010142	Transistor	BC327-40	
TX26	70010148	Transistor	BD434	
TX27	70010150	Transistor	BC848B	
TX28	70011386	Transistor	2SA1020-Y	
TX44	70010150	Transistor	BC848B	
TX45	70010943	Transistor	BC807	
		- DIODES -		
DC45	70041093	Chip Jumper		
DF30	70010963	Diode, Zener	ZMM9.1	
DF31	70010342	Diode, Chip	LL4148	
DF34	70010342	Diode, Chip	LL4148	
DN44	70010342	Diode, Chip	LL4148	
DS63	70010964	Diode, Zener	ZMM7.5	
DV58	70010342	Diode, Chip	LL4148	
DW26	70010153	Diode	1N4148	
DW27	70010342	Diode, Chip	LL4148	
DW86	70010342	Diode, Chip	LL4148	
DW92	70010342	Diode, Chip	LL4148	
DW94	24871102	Res, Chip	1K	J 1/8W
DW97	70041093	Chip Jumper		
DW98	70010342	Diode, Chip	LL4148	
DX22	70010342	Diode, Chip	LL4148	
		- COILS -		
LF01	70010478	Coil, Peaking		
LF02	23237985	Coil, Peaking	TRF4150AC	
LF04	70010490	Coil, Peaking		
LF09	23237983	Coil, Peaking	TRF4220AC	
LF11	70010493	Coil, Peaking		
LF24	23237985	Coil, Peaking	TRF4150AC	
LF32	70010490	Coil, Peaking		
LF48	23237976	Coil, Peaking	TRF4820AC	
LF49	23237972	Coil, Peaking	TRF4181AC	
LI10	70010923	Coil, Peaking		
LI16	70041096	Chip Jumper		
LN01	70011205	Coil, Peaking		
LN08	70010918	Coil, Peaking		
LN38	70010097	Coil, Peaking		
LS47	70010927	Coil, Peaking		
LS55	70011225	Coil, Variable		
LS61	70010928	Coil, Peaking		
LS62	70010928	Coil, Peaking		
LV03	70010919	Coil, Peaking		
LV07	70010562	Coil, Peaking		
LV10	23237983	Coil, Peaking	TRF4220AC	
LV12	23237985	Coil, Peaking	TRF4150AC	
LV36	23237999	Coil, Peaking	TRF4109AC	
LV38	70010562	Coil, Peaking		
LV55	23237975	Coil, Peaking	TRF4101AC	
LV60	70010490	Coil, Peaking		
LW01	70011203	Coil, Peaking		
LW02	70041093	Chip Jumper		
LW11	70011258	Coil, Chip		
LW99	23237983	Coil, Peaking	TRF4220AC	
LX01	70010927	Coil, Peaking		
		- CAPACITORS -		

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CA01	70041030	Cap, Plastic	680NF	M 50V
CA02	70040288	Cap, Plastic	470NF	M 63V
CA03	70041003	Cap, Chip	680PF	K 50V
CA32	70040268	Cap, Ceramic, Chip	22NF	K 25V
CA40	70041283	Cap, Chip	8.2PF	D 50V
CA41	70041283	Cap, Chip	8.2PF	D 50V
CA42	70041328	Cap, Chip	100NF	Z 25V
CA45	70040987	Cap, Chip	27PF	J 50V
CA55	24794101	Cap, Electrolytic	100MF	M 16V
CA81	70041051	Cap, Electrolytic	47MF	M 16V
CA82	70041006	Cap, Chip	10NF	J 50V
CA86	70041093	Chip Jumper		
CA87	70041096	Chip Jumper		
CA88	70041096	Chip Jumper		
CC48	70040998	Cap, Chip	100NF	Z 25V
CF02	24774560	Cap, Chip	56PF	J 50V
CF03	70040240	Cap, Ceramic, Chip	27PF	J 50V
CF06	70041007	Cap, Chip	22NF	M 25V
CF07	24630852	Cap, Electrolytic	22MF	M 16V
CF09	24774120	Cap, Chip	12PF	J 50V
CF11	24774120	Cap, Chip	12PF	J 50V
CF13	24774151	Cap, Chip	150PF	J 50V
CF19	24815152	Cap, Chip	1500PF	K 50V
CF21	24205479	Cap, Electrolytic	4.7MF	M 35V
CF22	70040247	Cap, Ceramic, Chip	1NF	J 50V
CF23	70041006	Cap, Chip	10NF	J 50V
CF24	24774820	Cap, Chip	82PF	J 50V
CF28	70041007	Cap, Chip	22NF	M 25V
CF29	70041241	Cap, Electrolytic	47MF	M 16V
CF30	70040268	Cap, Ceramic, Chip	22NF	K 25V
CF31	24774120	Cap, Chip	12PF	J 50V
CF32	24774479	Cap, Chip	4.7PF	
CF33	24774560	Cap, Chip	56PF	J 50V
CF38	70041006	Cap, Chip	10NF	J 50V
CF41	70040493	Cap, Chip	10NF	K 50V
CF43	70041108	Cap, Chip	10NF	M 50V
CF45	70040998	Cap, Chip	100NF	Z 25V
CF46	70041006	Cap, Chip	10NF	J 50V
CF47	24774680	Cap, Chip	68PF	J 50V
CF48	24774151	Cap, Chip	150PF	J 50V
CF51	24774680	Cap, Chip	68PF	J 50V
CI01	70040227	Cap, Ceramic, Chip	1NF	J 50V
CI07	70041096	Chip Jumper		
CI08	70041007	Cap, Chip	22NF	M 25V
CI14	70041007	Cap, Chip	22NF	M 25V
CI16	70041007	Cap, Chip	22NF	M 25V
CI39	70041020	Cap, Chip	56PF	J 50V
CI40	70041006	Cap, Chip	10NF	J 50V
CI41	70040524	Cap, Electrolytic	22MF	X 10V
CI42	70040527	Cap, Electrolytic	4.7MF	M 16V
CI43	70040507	Cap, Plastic	470NF	J 63V
CI44	70041019	Cap, Chip	39PF	J 50V
CI45	70040287	Cap, Plastic	100NF	M 50V
CI46	70041007	Cap, Chip	22NF	M 25V
CI47	70040247	Cap, Ceramic, Chip	1NF	J 50V
CI50	24630850	Cap, Electrolytic	47MF	M 16V
CI60	70041007	Cap, Chip	22NF	M 25V
CI72	24774270	Cap, Chip	27PF	J 50V
CN01	24774680	Cap, Chip	68PF	J 50V
CN03	24630852	Cap, Electrolytic	22MF	M 16V
CN05	24774121	Cap, Chip	120PF	J 50V
CN06	70040733	Cap, Chip	560PF	J 50V
CN08	70041016	Cap, Chip	47PF	J 50V
CN09	70041055	Cap, Electrolytic	3.3MF	M 50V
CN11	70041055	Cap, Electrolytic	3.3MF	M 50V
CN12	24538334	Cap, Plastic	0.33MF	J 50V
CN13	70041000	Cap, Chip	220NF	Z 50V
CN17	70040985	Cap, Chip	220PF	J 50V
CN18	24783399	Cap, Chip	3.9PF	
CN22	70041007	Cap, Chip	22NF	M 25V
CN23	70040493	Cap, Chip	10NF	K 50V
CN24	70041108	Cap, Chip	10NF	M 50V
CN25	70041007	Cap, Chip	22NF	M 25V
CN32	70041104	Cap, Chip	68NF	Z 25V
CN33	70040412	Cap, Electrolytic	220MF	M 10V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CN34	70041005	Cap, Chip	6.8NF	K 50V
CN36	70041042	Cap, Electrolytic	10MF	X
CN37	24633220	Cap, Electrolytic	22MF	M 16V
CN39	70041006	Cap, Chip	10NF	J 50V
CN41	70041055	Cap, Electrolytic	3.3MF	M 50V
CN44	70041023	Cap, Chip	22NF	M 50V
CN50	70041055	Cap, Electrolytic	3.3MF	M 50V
CN51	70041041	Cap, Electrolytic	47MF	X 63V
CS01	24794101	Cap, Electrolytic	100MF	M 16V
CS39	24203100	Cap, Electrolytic	10MF	M 16V
CS40	24203100	Cap, Electrolytic	10MF	M 16V
CS42	70040981	Cap, Chip	150PF	J 50V
CS44	70041257	Cap, Chip	4.7PF	C
CS55	24774820	Cap, Chip	82PF	J 50V
CS57	24774560	Cap, Chip	56PF	J 50V
CS58	70041002	Cap, Chip	680PF	J 50V
CS59	24774121	Cap, Chip	120PF	J 50V
CS61	70041258	Cap, Chip	47NF	50V
CS62	24203100	Cap, Electrolytic	10MF	M 16V
CS63	70041006	Cap, Chip	10NF	J 50V
CS64	24203100	Cap, Electrolytic	10MF	M 16V
CV01	24092293	Cap, Chip	0.1MF	Z 25V
CV02	70041006	Cap, Chip	10NF	J 50V
CV03	70041051	Cap, Electrolytic	47MF	M 16V
CV05	70040244	Cap, Ceramic, Chip	100PF	J 50V
CV06	70040296	Cap, Ceramic	22NF	Z 40V
CV07	24774680	Cap, Chip	68PF	J 50V
CV08	70040241	Cap, Ceramic, Chip	47PF	J 50V
CV10	70041022	Cap, Chip	36PF	J 50V
CV11	70041006	Cap, Chip	10NF	J 50V
CV12	70041108	Cap, Chip	10NF	M 50V
CV13	70040287	Cap, Plastic	100NF	M 50V
CV14	70041093	Chip Jumper		
CV17	70041131	Cap, Chip	390PF	J 50V
CV24	70041093	Chip Jumper		
CV28	70041023	Cap, Chip	22NF	M 50V
CV34	70041025	Cap, Chip	82PF	J 50V
CV35	70040723	Cap, Electrolytic	1MF	M 50V
CV36	70040240	Cap, Ceramic, Chip	27PF	J 50V
CV37	70040246	Cap, Ceramic, Chip	270PF	J 50V
CV38	24774470	Cap, Chip	47PF	J 50V
CV39	24783390	Cap, Chip	39PF	J 50V
CV41	70041108	Cap, Chip	10NF	M 50V
CV42	70041114	Cap, Ceramic	33NF	K 50V
CV43	24205479	Cap, Electrolytic	4.7MF	M 35V
CV44	70041006	Cap, Chip	10NF	J 50V
CV46	70041019	Cap, Chip	39PF	J 50V
CV47	70041107	Cap, Chip	18PF	J 50V
CV48	24093962	Cap, Variable	20PF	
CV49	24815222	Cap, Chip	2200PF	K 50V
CV51	70040723	Cap, Electrolytic	1MF	M 50V
CV53	24774101	Cap, Chip	100PF	J 50V
CV54	70040990	Cap, Chip	12PF	J 50V
CV55	24092293	Cap, Chip	0.1MF	Z 25V
CV56	70040412	Cap, Electrolytic	220MF	M 10V
CV57	70041025	Cap, Chip	82PF	J 50V
CV58	70040995	Cap, Chip	33PF	J 50V
CV59	70041007	Cap, Chip	22NF	M 25V
CV61	70040723	Cap, Electrolytic	1MF	M 50V
CV62	70041006	Cap, Chip	10NF	J 50V
CV75	70041241	Cap, Electrolytic	47MF	M 16V
CV83	24814223	Cap, Chip	2200PF	Z 50V
CV85	70040238	Cap, Ceramic, Chip	15PF	J 50V
CW01	24774101	Cap, Chip	100PF	J 50V
CW02	24774101	Cap, Chip	100PF	J 50V
CW03	24794101	Cap, Electrolytic	100MF	M 16V
CW04	70041007	Cap, Chip	22NF	M 25V
CW05	70041007	Cap, Chip	22NF	M 25V
CW08	70041007	Cap, Chip	22NF	M 25V
CW09	70040418	Cap, Electrolytic	47MF	M 35V
CW10	70041241	Cap, Electrolytic	47MF	M 16V
CW11	24794101	Cap, Electrolytic	100MF	M 16V
CW30	70041007	Cap, Chip	22NF	M 25V
CW33	70041007	Cap, Chip	22NF	M 25V
CW38	70041007	Cap, Chip	22NF	M 25V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CW40	24203100	Cap, Electrolytic	10MF	M 16V
CW41	70041063	Cap, Chip	330PF	J 50V
CW43	70041007	Cap, Chip	22NF	M 25V
CW44	70040269	Cap, Ceramic, Chip	47NF	Z 50V
CW45	70040723	Cap, Electrolytic	1MF	M 50V
CW47	70041241	Cap, Electrolytic	47MF	M 16V
CW51	24794101	Cap, Electrolytic	100MF	M 16V
CW52	24092293	Cap, Chip	0. 1MF	Z 25V
CW55	24774680	Cap, Chip	68PF	J 50V
CW56	24633220	Cap, Electrolytic	22MF	M 16V
CW57	24287822	Cap, Chip	8. 2NF	Z 50V
CW58	24205479	Cap, Electrolytic	4. 7MF	M 35V
CW61	70040993	Cap, Chip	330PF	K 50V
CW65	70041241	Cap, Electrolytic	47MF	M 16V
CW73	24203101	Cap, Electrolytic	100MF	M 16V
CW74	70040721	Cap, Electrolytic	22MF	M 16V
CW76	24774180	Cap, Chip	18PF	J 50V
CW77	24203101	Cap, Electrolytic	100MF	M 16V
CW78	24203101	Cap, Electrolytic	100MF	M 16V
CW79	24203101	Cap, Electrolytic	100MF	M 16V
CW85	70040268	Cap, Ceramic, Chip	22NF	K 25V
CW94	24205479	Cap, Electrolytic	4. 7MF	M 35V
CW97	24203100	Cap, Electrolytic	10MF	M 16V
CW98	24794101	Cap, Electrolytic	100MF	M 16V
CW99	70011366	Cap, Electrolytic	220MF	M 16V
CX01	24630852	Cap, Electrolytic	22MF	M 16V
CX02	70040248	Cap, Ceramic, Chip	470PF	J 50V
CX05	70040246	Cap, Ceramic, Chip	270PF	J 50V
CX06	24794101	Cap, Electrolytic	100MF	M 16V
CX07	70040723	Cap, Electrolytic	1MF	M 50V
CX16	70040723	Cap, Electrolytic	1MF	M 50V
		- RESISTORS -		
RA01	24871474	Res, Chip	470K	J 1/8W
RA05	24871561	Res, Chip	560	J 1/8W
RA35	24872101	Res, Chip	100	J 1/16W
RA37	24872391	Res, Chip	390	J 1/16W
RA44	70040350	Res, Chip	220	J 1/16W
RA45	24872101	Res, Chip	100	J 1/16W
RA47	24871122	Res, Chip	1. 2K	J 1/8W
RA60	70040391	Chip Jumper		
RC45	24871682	Res, Chip	6. 8K	J 1/8W
RF02	24872222	Res, Chip	2. 2K	J 1/16W
RF03	24872391	Res, Chip	390	J 1/16W
RF04	24872122	Res, Chip	1. 2K	J 1/16W
RF06	24872471	Res, Chip	470	J 1/16W
RF07	24872431	Res, Chip	430	J 1/16W
RF08	24872682	Res, Chip	6. 8K	J 1/16W
RF10	24871472	Res, Chip	4. 7K	J 1/8W
RF11	24872471	Res, Chip	470	J 1/16W
RF12	24872182	Res, Chip	1. 8K	J 1/16W
RF13	24872822	Res, Chip	8. 2K	J 1/16W
RF14	24872102	Res, Chip	1K	J 1/16W
RF24	24871561	Res, Chip	560	J 1/8W
RF26	24872681	Res, Chip	680	J 1/16W
RF30	24872102	Res, Chip	1K	J 1/16W
RF31	24872102	Res, Chip	1K	J 1/16W
RF32	24872183	Res, Chip	18K	J 1/16W
RF35	24872472	Res, Chip	4. 7K	J 1/16W
RF41	70041167	Res, Chip	1. 8K	J 1/8W
RF43	24872152	Res, Chip	1. 5K	J 1/16W
RF45	24871271	Res, Chip	270	J 1/8W
RF46	24872473	Res, Chip	47K	J 1/16W
RF47	24872822	Res, Chip	8. 2K	J 1/16W
RF48	24872182	Res, Chip	1. 8K	J 1/16W
RF49	24872182	Res, Chip	1. 8K	J 1/16W
RF50	24872122	Res, Chip	1. 2K	J 1/16W
RF51	24871681	Res, Chip	680	J 1/8W
RF52	24872222	Res, Chip	2. 2K	J 1/16W
RI05	70040690	Res, Chip	56	J 1/8W
RI06	24872222	Res, Chip	2. 2K	J 1/16W
RI07	24872220	Res, Chip	22	J 1/16W
RI08	24872820	Res, Chip	82	J 1/16W
RI09	24872822	Res, Chip	8. 2K	J 1/16W
RI10	24872101	Res, Chip	100	J 1/16W
RI38	70041096	Chip Jumper		

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RI39	24872102	Res, Chip	1K	J 1/16W
RI40	24872153	Res, Chip	15K	J 1/16W
RI41	24871103	Res, Chip	10K	J 1/8W
RI42	24871221	Res, Chip	220	J 1/8W
RI44	24872222	Res, Chip	2. 2K	J 1/16W
RI45	24872271	Res, Chip	270	J 1/16W
RI46	24872100	Res, Chip	10	J 1/16W
RI47	24872271	Res, Chip	270	J 1/16W
RI51	24871271	Res, Chip	270	J 1/8W
RI61	24872151	Res, Chip	150	J 1/16W
RN01	70040679	Res, Chip	2. 2K	J 1/8W
RN02	24872152	Res, Chip	1. 5K	J 1/16W
RN04	24871332	Res, Chip	3. 3K	J 1/8W
RN05	24871471	Res, Chip	470	J 1/8W
RN06	24871152	Res, Chip	1. 5K	J 1/8W
RN07	70041260	Res, Chip	5. 6M	J
RN08	24872223	Res, Chip	22K	J 1/16W
RN10	24871101	Res, Chip	100	J 1/8W
RN11	24872391	Res, Chip	390	J 1/16W
RN13	24872273	Res, Chip	27K	J 1/16W
RN16	24872184	Res, Chip	180K	J 1/16W
RN17	24872122	Res, Chip	1. 2K	J 1/16W
RN18	24872472	Res, Chip	4. 7K	J 1/16W
RN20	70041096	Chip Jumper		
RN21	24872272	Res, Chip	2. 7K	J 1/16W
RN22	24872682	Res, Chip	6. 8K	J 1/16W
RN23	24872822	Res, Chip	8. 2K	J 1/16W
RN24	24872223	Res, Chip	22K	J 1/16W
RN25	70041089	Res, Chip	8. 2M	J
RN27	24872472	Res, Chip	4. 7K	J 1/16W
RN28	24872822	Res, Chip	8. 2K	J 1/16W
RN29	24872123	Res, Chip	12K	J 1/16W
RN32	24872822	Res, Chip	8. 2K	J 1/16W
RN33	24872103	Res, Chip	10K	J 1/16W
RN34	24872224	Res, Chip	220K	J 1/16W
RN35	24871101	Res, Chip	100	J 1/8W
RN37	24871472	Res, Chip	4. 7K	J 1/8W
RN38	24872273	Res, Chip	27K	J 1/16W
RN39	24872222	Res, Chip	2. 2K	J 1/16W
RN57	24872102	Res, Chip	1K	J 1/16W
RN59	70040103	Res, Carbon	1K	J 1/4W
RN65	70041096	Chip Jumper		
RN78	70041096	Chip Jumper		
⚠RS02	70040124	Res, Fusible	33	J 0. 3W
RS03	70040570	Res, Chip	470	J
RS19	70040106	Res, Carbon	10K	J 1/4W
RS39	24872152	Res, Chip	1. 5K	J 1/16W
RS40	24871123	Res, Chip	12K	J 1/8W
RS41	24871123	Res, Chip	12K	J 1/8W
RS42	70040339	Res, Chip	330	J 1/16W
RS43	70040355	Res, Chip	15K	J 1/16W
RS44	24871102	Res, Chip	1K	J 1/8W
RS45	24871220	Res, Chip	22	J 1/8W
RS51	24871474	Res, Chip	470K	J 1/8W
RS55	24872562	Res, Chip	5. 6K	J 1/16W
RS58	24872823	Res, Chip	82K	J 1/16W
RS59	70040118	Res, Carbon	4. 7K	J 1/4W
RS60	24872222	Res, Chip	2. 2K	J 1/16W
RS63	70041132	Res, Carbon	120	J 1/4W
RV01	24872102	Res, Chip	1K	J 1/16W
RV02	24872122	Res, Chip	1. 2K	J 1/16W
RV03	70040570	Res, Chip	470	J
RV05	24871820	Res, Chip	82	J 1/8W
RV07	24872102	Res, Chip	1K	J 1/16W
RV08	24872682	Res, Chip	6. 8K	J 1/16W
RV09	24872822	Res, Chip	8. 2K	J 1/16W
RV10	24872102	Res, Chip	1K	J 1/16W
RV11	24872471	Res, Chip	470	J 1/16W
RV13	70011425	Res, Chip	3K	
RV14	24872202	Res, Chip	2K	J 1/16W
RV15	70041096	Chip Jumper		
RV17	24872222	Res, Chip	2. 2K	J 1/16W
RV20	70041096	Chip Jumper		
RV22	24872101	Res, Chip	100	J 1/16W
RV25	24872561	Res, Chip	560	J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RV26	24872332	Res, Chip	3.3K	J 1/16W
RV27	24871681	Res, Chip	680	J 1/8W
RV28	24872471	Res, Chip	470	J 1/16W
RV33	70040784	Res, Carbon	22K	J 1/4W
RV35	24872223	Res, Chip	22K	J 1/16W
RV36	70040701	Res, Carbon	100	J 1/4W
RV39	24872472	Res, Chip	4.7K	J 1/16W
RV43	24872471	Res, Chip	470	J 1/16W
RV46	24871102	Res, Chip	1K	J 1/8W
RV49	24871153	Res, Chip	15K	J 1/8W
RV50	70040961	Res, Carbon	1K	J 1/4W
RV51	24871152	Res, Chip	1.5K	J 1/8W
RV52	24872332	Res, Chip	3.3K	J 1/16W
RV53	70040962	Res, Carbon	47K	J 1/4W
RV58	24872222	Res, Chip	2.2K	J 1/16W
RV61	24872103	Res, Chip	10K	J 1/16W
RV62	24872561	Res, Chip	560	J 1/16W
RV63	24872561	Res, Chip	560	J 1/16W
RV80	70041096	Chip Jumper		
RV81	70041093	Chip Jumper		
RV85	24872153	Res, Chip	15K	J 1/16W
RV87	70041069	Res, Carbon	33K	J
RV88	24871103	Res, Chip	10K	J 1/8W
RV89	24872822	Res, Chip	8.2K	J 1/16W
RW03	24872102	Res, Chip	1K	J 1/16W
RW04	24871102	Res, Chip	1K	J 1/8W
RW05	24872102	Res, Chip	1K	J 1/16W
RW06	70041093	Chip Jumper		
RW08	24872104	Res, Chip	100K	J 1/16W
RW09	70040784	Res, Carbon	22K	J 1/4W
RW10	24872103	Res, Chip	10K	J 1/16W
RW101	24872271	Res, Chip	270	J 1/16W
RW11	70041094	Res, Chip	130	J
RW12	24872221	Res, Chip	220	J 1/16W
RW13	24872681	Res, Chip	680	J 1/16W
RW14	24871272	Res, Chip	2.7K	J 1/8W
RW15	24872221	Res, Chip	220	J 1/16W
RW16	24872331	Res, Chip	330	J 1/16W
RW17	24872103	Res, Chip	10K	J 1/16W
RW18	24872273	Res, Chip	27K	J 1/16W
RW20	70041096	Chip Jumper		
RW21	70041096	Chip Jumper		
RW22	24872472	Res, Chip	4.7K	J 1/16W
RW30	70041096	Chip Jumper		
RW37	24871561	Res, Chip	560	J 1/8W
RW43	24871330	Res, Chip	33	J 1/8W
RW44	24871103	Res, Chip	10K	J 1/8W
RW45	24872472	Res, Chip	4.7K	J 1/16W
RW46	24872822	Res, Chip	8.2K	J 1/16W
RW47	24872822	Res, Chip	8.2K	J 1/16W
RW48	24872222	Res, Chip	2.2K	J 1/16W
RW49	24872822	Res, Chip	8.2K	J 1/16W
RW50	24872472	Res, Chip	4.7K	J 1/16W
⚠RW51	70040456	Res, Fusible	10	J
RW52	24871101	Res, Chip	100	J 1/8W
RW53	24872680	Res, Chip	68	J 1/16W
RW54	24872561	Res, Chip	560	J 1/16W
RW55	24872750	Res, Chip	75	J 1/16W
RW56	24871102	Res, Chip	1K	J 1/8W
RW57	24871474	Res, Chip	470K	J 1/8W
RW58	24872224	Res, Chip	220K	J 1/16W
RW59	24872681	Res, Chip	680	J 1/16W
RW60	24872183	Res, Chip	18K	J 1/16W
RW61	24872681	Res, Chip	680	J 1/16W
RW62	24871183	Res, Chip	18K	J 1/8W
RW63	70040106	Res, Carbon	10K	J 1/4W
RW64	24872103	Res, Chip	10K	J 1/16W
RW67	24872122	Res, Chip	1.2K	J 1/16W
RW68	24872153	Res, Chip	15K	J 1/16W
RW69	24872393	Res, Chip	39K	J 1/16W
RW71	24872103	Res, Chip	10K	J 1/16W
RW72	24872123	Res, Chip	12K	J 1/16W
RW73	24872102	Res, Chip	1K	J 1/16W
RW74	24871222	Res, Chip	2.2K	J 1/8W
RW75	24872153	Res, Chip	15K	J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RW76	24872242	Res, Chip	2.4K	J 1/16W
RW77	24872911	Res, Chip	910	J 1/16W
RW78	24871223	Res, Chip	22K	J 1/8W
RW79	24872392	Res, Chip	3.9K	J 1/16W
RW80	24872122	Res, Chip	1.2K	J 1/16W
RW81	24872153	Res, Chip	15K	J 1/16W
RW82	24872223	Res, Chip	22K	J 1/16W
RW83	24871242	Res, Chip	2.4K	J 1/8W
RW84	24872680	Res, Chip	68	J 1/16W
RW85	24871222	Res, Chip	2.2K	J 1/8W
RW86	24871821	Res, Chip	820	J 1/8W
RW87	24872223	Res, Chip	22K	J 1/16W
RW88	24872272	Res, Chip	2.7K	J 1/16W
RW89	24872223	Res, Chip	22K	J 1/16W
RW90	24872820	Res, Chip	82	J 1/16W
RW91	24871271	Res, Chip	270	J 1/8W
RW92	24872153	Res, Chip	15K	J 1/16W
RW93	24871181	Res, Chip	180	J 1/8W
RW96	24872683	Res, Chip	68K	J 1/16W
RW97	70041071	Res, Carbon	3.9	J
RX01	70040314	Res, Carbon	470	J 1/8W
RX02	24871823	Res, Chip	82K	J 1/8W
RX03	24872101	Res, Chip	100	J 1/16W
RX04	24872153	Res, Chip	15K	J 1/16W
RX05	24872391	Res, Chip	390	J 1/16W
RX06	24872391	Res, Chip	390	J 1/16W
RX07	24872103	Res, Chip	10K	J 1/16W
RX08	24871472	Res, Chip	4.7K	J 1/8W
RX09	24872272	Res, Chip	2.7K	J 1/16W
RX11	24872223	Res, Chip	22K	J 1/16W
RX12	24871102	Res, Chip	1K	J 1/8W
RX13	24872562	Res, Chip	5.6K	J 1/16W
RX14	24872562	Res, Chip	5.6K	J 1/16W
RX15	24872272	Res, Chip	2.7K	J 1/16W
RX16	24871103	Res, Chip	10K	J 1/8W
RX17	24871272	Res, Chip	2.7K	J 1/8W
RX18	24872223	Res, Chip	22K	J 1/16W
RX23	24871181	Res, Chip	180	J 1/8W
RX24	24871103	Res, Chip	10K	J 1/8W
RX27	24872152	Res, Chip	1.5K	J 1/16W
RX28	24871103	Res, Chip	10K	J 1/8W
RX29	70041096	Chip Jumper		
RX30	70040118	Res, Carbon	4.7K	J 1/4W
RX32	70041093	Chip Jumper		
⚠RX35	70041116	Res, Fusible	39	J 0.3W
RX41	24871123	Res, Chip	12K	J 1/8W
RX43	24871472	Res, Chip	4.7K	J 1/8W
RX44	24871682	Res, Chip	6.8K	J 1/8W
RX45	24872472	Res, Chip	4.7K	J 1/16W
RX46	24872223	Res, Chip	22K	J 1/16W
RX50	24872122	Res, Chip	1.2K	J 1/16W
RX58	70041096	Chip Jumper		
RX61	70040355	Res, Chip	15K	J 1/16W
RX64	70040355	Res, Chip	15K	J 1/16W
RX70	24872101	Res, Chip	100	J 1/16W
RX90	24872750	Res, Chip	75	J 1/16W
RX91	24872272	Res, Chip	2.7K	J 1/16W
RX93	70040106	Res, Carbon	10K	J 1/4W
RX96	70041096	Chip Jumper		
J001	70041096	Chip Jumper		
J002	70041093	Chip Jumper		
J003	70041093	Chip Jumper		
J007	70041093	Chip Jumper		
J008	70041096	Chip Jumper		
J012	70041093	Chip Jumper		
J014	70041093	Chip Jumper		
J018	70041093	Chip Jumper		
J021	70041093	Chip Jumper		
J023	70041093	Chip Jumper		
J024	70041093	Chip Jumper		
J025	70041093	Chip Jumper		
J026	70041093	Chip Jumper		
J027	70041093	Chip Jumper		
J030	70041093	Chip Jumper		
J035	70041093	Chip Jumper		

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
J038	70041093	Chip Jumper	
J039	70041093	Chip Jumper	
J040	70041096	Chip Jumper	
J043	70041093	Chip Jumper	
J045	70041093	Chip Jumper	
J048	70041093	Chip Jumper	
J049	70041096	Chip Jumper	
J050	70041093	Chip Jumper	
J051	70041096	Chip Jumper	
J052	70041096	Chip Jumper	
J053	70041096	Chip Jumper	
J054	70041096	Chip Jumper	
J055	70041093	Chip Jumper	
J056	70041096	Chip Jumper	
J057	70041093	Chip Jumper	
J059	70041093	Chip Jumper	
J060	70041093	Chip Jumper	
J062	70041096	Chip Jumper	
J065	70041096	Chip Jumper	
J066	70041096	Chip Jumper	
J069	70041093	Chip Jumper	
J070	70041093	Chip Jumper	
J071	70041093	Chip Jumper	
J073	70041096	Chip Jumper	
J074	70041093	Chip Jumper	
J075	70041093	Chip Jumper	
J076	70041093	Chip Jumper	
J077	70041093	Chip Jumper	
J078	70041096	Chip Jumper	
J079	70041093	Chip Jumper	
J084	70041093	Chip Jumper	
J086	70041093	Chip Jumper	
J087	70041096	Chip Jumper	
J090	70041093	Chip Jumper	
J091	70041093	Chip Jumper	
J092	70041096	Chip Jumper	
J093	70041093	Chip Jumper	
J095	70041093	Chip Jumper	
J096	70041093	Chip Jumper	
J097	70041096	Chip Jumper	
J098	70041093	Chip Jumper	
J100	70041093	Chip Jumper	
J101	70041093	Chip Jumper	
J102	70041093	Chip Jumper	
J103	70041093	Chip Jumper	
J104	70041093	Chip Jumper	
J105	70041093	Chip Jumper	
J106	70041093	Chip Jumper	
J107	70041093	Chip Jumper	
J110	70041093	Chip Jumper	
J114	70041093	Chip Jumper	
J115	70041093	Chip Jumper	
J116	70041093	Chip Jumper	
J117	70041093	Chip Jumper	
J118	70041093	Chip Jumper	
J120	70041093	Chip Jumper	
J122	70041093	Chip Jumper	
J124	70041093	Chip Jumper	
J125	70041096	Chip Jumper	
J127	70041096	Chip Jumper	
J128	70041093	Chip Jumper	
J130	70041093	Chip Jumper	
J131	70041093	Chip Jumper	
J133	70041096	Chip Jumper	
J134	70041093	Chip Jumper	
J139	70041093	Chip Jumper	
J140	70041093	Chip Jumper	
J143	70041093	Chip Jumper	
J144	70041093	Chip Jumper	
J150	70041096	Chip Jumper	
J152	70041093	Chip Jumper	
J153	70041093	Chip Jumper	
J155	70041093	Chip Jumper	
J156	70041096	Chip Jumper	
J158	70041093	Chip Jumper	
J159	70041093	Chip Jumper	
J160	70041096	Chip Jumper	
J170	70041096	Chip Jumper	
J180	70041093	Chip Jumper	
J181	70041093	Chip Jumper	
J182	70041093	Chip Jumper	
J183	70041093	Chip Jumper	
J184	70041093	Chip Jumper	
J188	70041093	Chip Jumper	
J189	70041096	Chip Jumper	
J200	70041093	Chip Jumper	
J201	70041093	Chip Jumper	
J202	70041093	Chip Jumper	
J203	70041093	Chip Jumper	
J204	70041093	Chip Jumper	
J205	70041096	Chip Jumper	
J207	70041096	Chip Jumper	
J215	70041096	Chip Jumper	
J216	70041093	Chip Jumper	
J217	70041096	Chip Jumper	
J218	70041096	Chip Jumper	
J220	70041093	Chip Jumper	
J221	70041093	Chip Jumper	
J256	70041096	Chip Jumper	
J271	70041093	Chip Jumper	
J354	70041096	Chip Jumper	
J370	70041093	Chip Jumper	
J384	70041093	Chip Jumper	
J420	70041093	Chip Jumper	
J427	70041093	Chip Jumper	
J434	70041093	Chip Jumper	
J456	70041096	Chip Jumper	
J460	70041093	Chip Jumper	
J461	70041096	Chip Jumper	
J472	70041093	Chip Jumper	
J473	70041093	Chip Jumper	
J476	70041096	Chip Jumper	
J481	70041093	Chip Jumper	
J485	70041093	Chip Jumper	
J489	70041093	Chip Jumper	
J495	70041096	Chip Jumper	
J502	70041093	Chip Jumper	
J503	70041093	Chip Jumper	
J504	70041096	Chip Jumper	
J512	70041096	Chip Jumper	
J513	70041096	Chip Jumper	
J514	70041096	Chip Jumper	
J515	70041093	Chip Jumper	
JI01	70041093	Chip Jumper	
JI05	70041096	Chip Jumper	
JI06	70041096	Chip Jumper	
JI07	70041096	Chip Jumper	
JI10	70041093	Chip Jumper	
JI11	70041096	Chip Jumper	
JI12	70041093	Chip Jumper	
JI13	70041096	Chip Jumper	
JI14	70041093	Chip Jumper	
JI15	70041096	Chip Jumper	
PA44	24066952	Res, Variable	10K
PF01	24066955	Res, Variable	1K
PF33	24066955	Res, Variable	1K
PF41	24066955	Res, Variable	1K
PI40	24066739	Res, Variable	10K
PN19	70040803	Res, Variable	2. 2K
PN21	70041221	Res, Variable	6. 8K
PN24	24066952	Res, Variable	10K
PN39	70040218	Res, Variable	22K
PN44	24066952	Res, Variable	10K
PS40	24066955	Res, Variable	1K
PV57	70040803	Res, Variable	2. 2K
		- MISCELLANEOUS -	
0005	70010910	Tuner/Modulator Unit	
FI45	70010933	Filter	
FN59	70011473	Filter	
FN591	70010124	LPF	

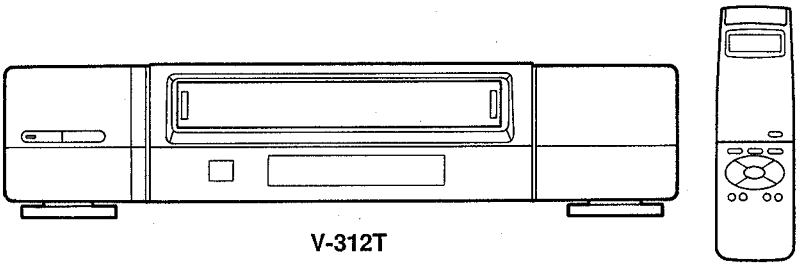
LOCATION NUMBER	PART NUMBER	DESCRIPTION	
FV01	70010938	Filter	
FV10	70010444	Filter	
FW03	70010321	Filter	
FW37	70010931	Filter	5.5MHz
FW39	70010930	Filter	5.5MHz
QA40	70011262	Crystal	
QV46	70010936	Crystal	
QW10	70010932	Filter	5.74MHz

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
		DIFFERENCE LIST		
V413G				
■0220	70090308	P C Board Assy	Key Display	
		- DIODES -		
DK03	--------	Not Used		
DK09	70010342	Diode, Chip	LL4148	
■0250	70090317	P C Board Assy	Main	
		- INTEGRATED CIRCUITS -		
IW31	70011212	IC	SDA5642X	
		- DIODES -		
DW97	70040205	Chip Jumper		
		- COILS -		
LW01	23238710	Coil, Peaking	TRF4220AJ	
LW31	70010097	Coil, Peaking		
		- CAPACITORS -		
CI15	24783569	Cap, Chip	5.6PF	C 50V
CV38	70040241	Cap, Ceramic, Chip	47PF	J 50V
CV75	--------	Not Used		
CV85	24774150	Cap, Chip	15PF	J 50V
CW31	70041241	Cap, Electrolytic	47MF	M 16V
CW32	70041006	Cap, Chip	10NF	J 50V
CW34	70041264	Cap, Chip	150PF	
CW35	70040730	Cap, Chip	100NF	M 25V
CW36	70041102	Cap, Chip	33NF	M 50V
CW41	70041118	Cap, Chip	220PF	J 50V
		- RESISTORS -		
RA45	24871101	Res, Chip	100	J 1/8W
RV14	70011426	Res, Chip	2K	
RW31	24872824	Res, Chip	820K	J 1/16W
RW32	24872101	Res, Chip	100	J 1/16W
RW33	24871105	Res, Chip	1M	J 1/8W
RW34	24872104	Res, Chip	100K	J 1/16W
RW35	24872512	Res, Chip	5.1K	J 1/16W
RW36	24872824	Res, Chip	820K	J 1/16W
RW39	24872222	Res, Chip	2.2K	J 1/16W
RW96	70040365	Res, Chip	68K	J 1/16W
J177	70041096	Chip Jumper		
PI40	24066952	Res, Variable	10K	
		- MISCELLANEOUS -		
FI10	70011227	Filter		
QW10	70011261	Filter	5.5MHz	

V08942

SERVICE DATA
FILE NO. 780 - 045

TOSHIBA
COLOR VIDEO CASSETTE RECORDER
V-312T,312G,322GS


V-312T

SPECIFICATIONS

GENERAL

Video recording system:	Head configuration 2-head rotary
Video signal:	CCIR standard, PAL color
Storage temperature:	-20° to +60°C (-4° to +140°F)
Operating temperature:	5° to 40°C (41° to 104°F)
Antenna:	75-ohms coaxial
Channel coverage:	STD: VHF E02 - E12, UHF: 21 - 69 CATV: VHF X - Z, S4 - S20 a total of up to 48 preselected channels
AERIAL output signal:	UHF channel 51 - 66 (variable)
Power requirement:	AC 220 – 240V, 50Hz
Power consumption:	25W
Weight:	5.6kg
Dimensions:	398(W) X 94(H) X 331 (D) mm

VIDEO

Input:	VIDEO LINE IN: AV socket, 1.0V (p-p), 75-ohms unbalanced, sync negative
Output:	VIDEO LINE OUT: AV socket, 1.0V (p-p), 75-ohms unbalanced, sync negative
Signal-to-noise ratio:	Better than 43 dB (SP mode)

AUDIO

Input:	AUDIO LINE IN: AV socket, – 3.8 dBm
Output:	AUDIO LINE OUT: AV socket, – 3.8 dBm
Frequency response:	80 to 10 kHz (SP mode)
Signal-to-noise ratio:	Better than 42 dB (SP mode)

TAPE TRANSPORT

Tape speed:	23.39 mm/sec. (SP mode), 11.7 mm/sec. (LP mode)
Maximum recording-time:	SP mode: 4 hours (with E-240) LP mode: 8 hours (with E-240)
Winding time:	Within 2 min. (E-180)

TIMER

Clock:	24 hour display, quartz control
No. of events:	8 over 1 year

Caution: Copyright Act 1956 Users of video recording equipment should note that it may be unlawful to record television broadcasts, cinematograph films or video recording without the permission of the relevant copyright owner.

Design and specifications are subject to change without notice.

PRINTED IN JAPAN May, 1992 Ⓢ

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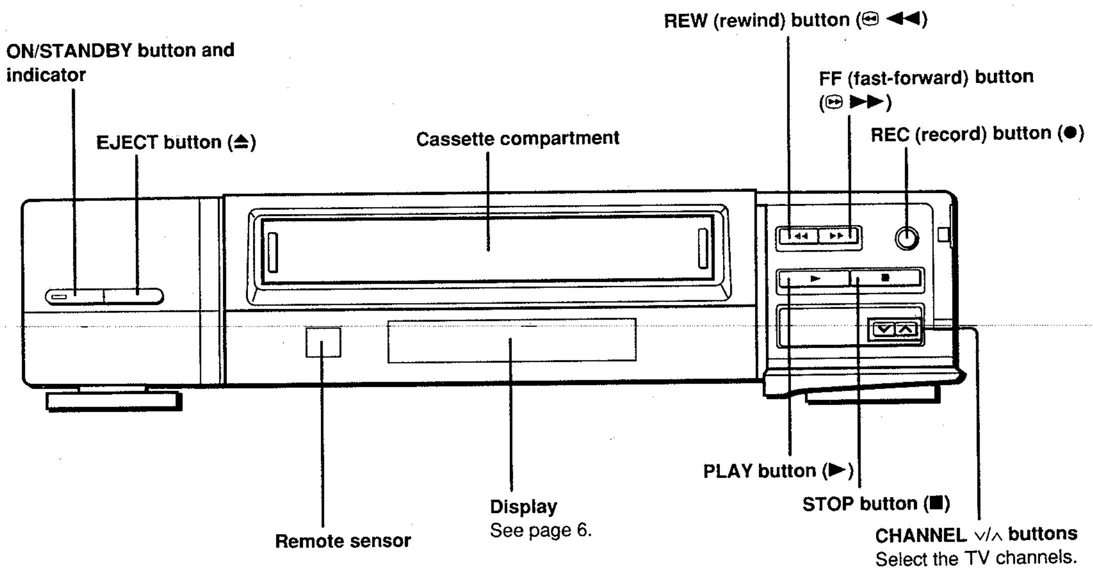
SECTION 1
GENERAL DESCRIPTION

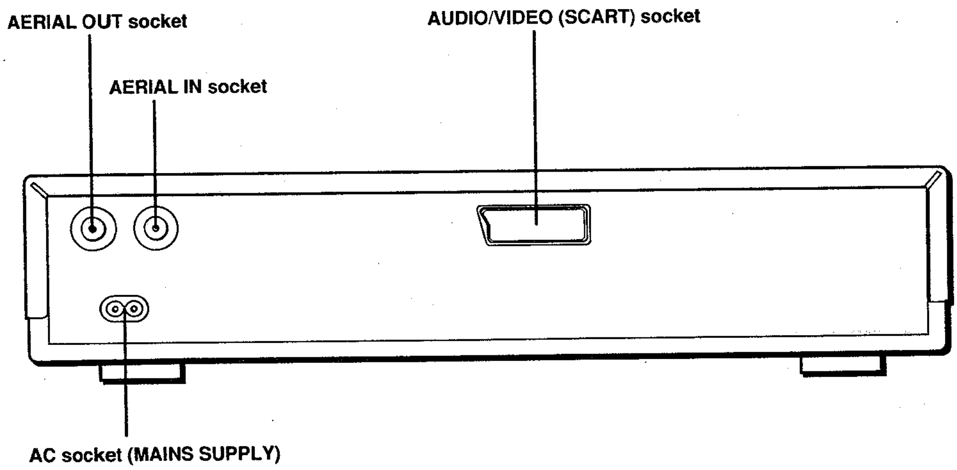
OPERATING INSTRUCTIONS

IDENTIFICATION OF CONTROLS

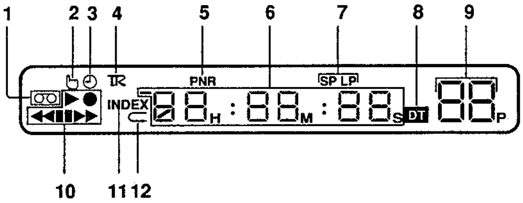
Front Panel


REW (rewind) button (⊖ ◀◀)
ON/STANDBY button and indicator
FF (fast-forward) button (⊕ ▶▶)
EJECT button (≜)
Cassette compartment
REC (record) button (●)
PLAY button (▶)
STOP button (■)
Display
See page 6.
Remote sensor
CHANNEL ∨/∧ buttons
Select the TV channels.

Rear Panel


AERIAL OUT socket
AUDIO/VIDEO (SCART) socket
AERIAL IN socket
AC socket (MAINS SUPPLY)

VTR Display



1 **Cassette indicator**
Lights when a cassette is loaded.

2 **OTR (One-touch Timer Recording) indicator (ⴆ)**
Lights while programming the one-touch timer recording.

3 **Timer indicator (⊘)**
Lights in the timer mode.

4 **Time remaining indicator (TR)**
Lights when the tape time remaining is displayed.

5 **PNR (Picture Noise Reduction) indicator**
Lights when picture noise reduction is activated with the PNR button.

6 **Multifunctional indicator**
Indicates the clock, tape time remaining, linear time counter, index, tracking and channel number.

7 **SP/LP indicator**
Indicates the recording tape speed.

8 **DT (Digital auto Tracking) indicator**
Lights when the auto tracking mode is selected with the DT button.

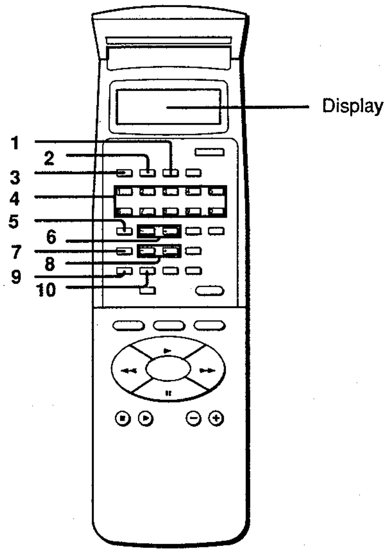
9 **Channel position number/L (line input) indicator**
Indicates the channel position number or line input mode.

10 **Tape footage indicators**
Indicate the tape operation mode.

11 **INDEX indicator**
Lights in the index mode.

12 **Repeat indicator (⊂)**
Lights when AUTO REPEAT is selected on the SET UP screen.

Remote Controller



1 **PROG. (programme) button**
Used to set timer programmes.

2 **CLOCK button**
Used to set the clock.

3 **INPUT SELECT button**
Selects the source to be recorded.

4 **Number buttons (1-0)**
Used for clock setting, channel presetting, timer programming, recording, etc.

5 **PRESET button**
Used to preset the TV channels.

6 **PICTURE/fine tuning –/+ buttons**
Adjusts the picture sharpness.
Also used to fine-tune TV channels.

7 **DT (Digital Tracking)/skip button**
Adjusts the tracking automatically. Also used to skip a TV channel.

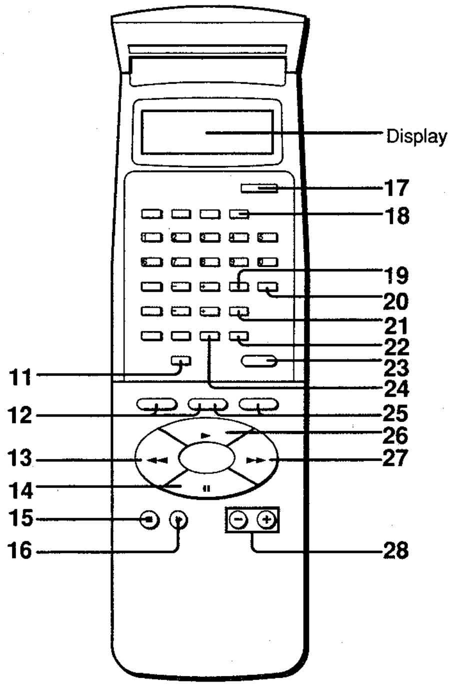
8 **TRACKING/V-LOCK –/+ buttons**
Adjusts the tracking manually. Also adjusts still picture stability.

9 **PNR (Picture Noise Reduction) button**
Press it when playing back a rental video tape or a copied tape.

10 **COUNTER RESET button**
Resets the linear tape counter to zero.

IDENTIFICATION OF CONTROLS

Remote Controller



11 **SP/LP button**
Selects the recording tape speed, SP (standard play) or LP (long play).

12 **REC ● (recording) buttons**
To start recording, press the two buttons simultaneously.

13 **REW ◄◄ (rewind) button**

14 **STILL II/PAUSE/FRAME button**
Temporarily stops the tape during playback or recording. Also freezes the picture or advances it by one frame.

15 **STOP ■ button**

16 **SLOW I► button**
Sets the VTR to slow-motion playback.

17 **TRANSMIT button**
Transmits the clock or timer programme data set on the remote controller to the VTR.

18 **OTR (One-touch Timer Recording) button**
Activates the one-touch timer and sets the OTR stop time.

19 **OSD (On-screen Display) button**
Turns on and off the on-screen display.

20 **DISP (display) button**
Turns on and off the on-screen display (tape operation mode, clock, counter, channel position number, etc.).

21 **COUNT/TR (counter/tape time remaining) select button**
Switches the clock, counter, cassette and tape time remaining display.

22 **INDEX button**
Used to register an index signal and activate the index search or skip search operation.

23 **ON/STANDBY button**
Turns the VTR on and off.

24 **GO TO button**
Used for the go-to function.

25 **⏲ TIMER buttons**
Sets the VTR to the timer standby mode.

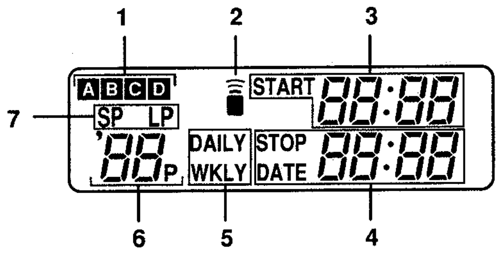
26 **PLAY ► button**

27 **FF ►► (fast-forward) button**

28 **CH/CURSOR –/+ (channel/cursor) buttons**
Select TV channels. Also moves the cursor on the remote controller display.

Important
The functions of the buttons on the remote controller vary with the operating mode of the VTR in use. For example, in the clock setting or timer programming mode, you cannot select the channel with the number buttons.

Controller Display



1 **Programme memory indicator**
Indicates the memory position where a timer programme is stored.

2 **Transmit indicator**
Blinks for about 2 seconds when the clock or timer programme data is transmitted to the VTR.
Blinks once when a tape operation button is pressed.

3 **Clock/timer start time**
Indicates the current time or the timer start time.

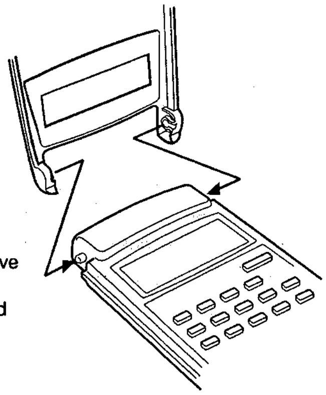
4 **Date/timer stop time**
Indicates the current month and day or the timer stop time.

5 **DAILY/WKLY (weekly) indicators**
Lights when setting the daily or weekly timer.

6 **Year/channel position/input mode indicator**
Indicates the current year, the channel position or the L (line input) indicator.

7 **Tape speed indicators**
Indicates the SP or LP mode.

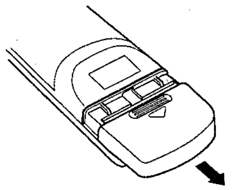
Replacing the controller top panel
If the top panel of the remote controller is removed, replace it as illustrated.



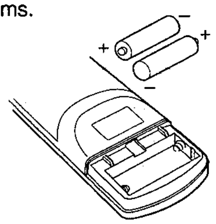
Align the groove with the projection, and insert.

Installing the Batteries

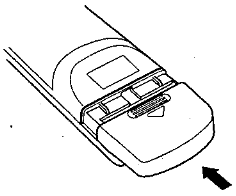
1 Open the battery compartment lid on the rear panel.



2 Install 2 batteries (R6 size) in the unit following the polarity diagrams.



3 Close the battery compartment lid.



Notes on batteries

- The life of the batteries is about six months depending on the conditions of use.
- If the remote controller does not operate correctly, replace all batteries with new ones.
- Do not dispose of the batteries by fire.
- If the remote controller is not to be used for a long period of time, remove the batteries to avoid possible damage from battery corrosion.

Caring for the remote controller

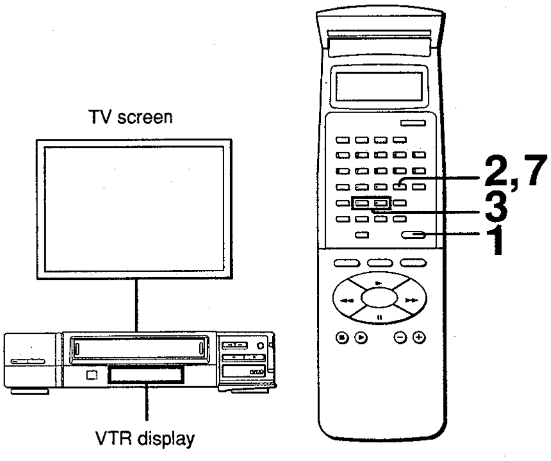
- When using the remote controller, press the buttons at intervals of about 1 second to ensure the correct mode of operation.
- Keep the remote controller away from extremely hot or humid places and avoid mechanical shocks.
- Do not expose the remote sensor of the VTR to a strong light source such as direct sunlight or illumination.

Operating range
The remote controller must have a "line of sight" to the infrared remote sensor on the front of the VTR. It must be within an angle of 30° on either side of the center.
When you use the remote controller while aiming it at the front side of the VTR, the maximum operating distance is about 7 m (within 30° of the center on either side, the effective operating distance is approximately 5 m).

TUNING THE TV TO THE VIDEO CHANNEL

Important
The following adjustment is necessary when the VTR is connected to the TV via the AERIAL OUT socket only.

The RF converter in the VTR changes the video and audio signals to the same type of signals used in TV broadcasts and outputs them from the AERIAL OUT socket. To receive these signals on the TV, one of the TV channels must be set aside as the channel exclusively for the VTR signals. This is called the video channel. The RF converter output channel can be changed using the on-screen display to the video channel selected on the TV.



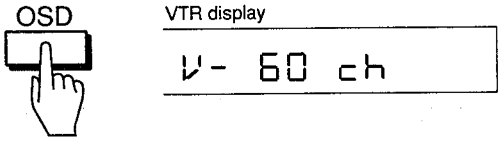
Set the TV to the video channel as follows:

1 Press the ON/STANDBY button.

2 Press and hold the OSD button for about 5 seconds. The following display appears on the VTR display.

Example: when channel 60 is factory-preset

Hold 5 seconds.



V- 60 ch

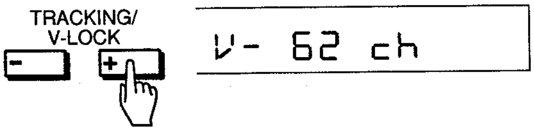
a) **If the displayed channel is used for a TV broadcast in your area:** you cannot use this channel for the video channel.
➜ Go to step 3.

b) **If the displayed channel is not used for a TV broadcast in your area:** you can use this channel for the video channel.
➜ Skip step 3 and go to step 4.

3 **Press the TRACKING/V-LOCK –/+ button to select another video channel between channels 51 and 66.**

You must select a channel:
- that is not used for a TV broadcast.
- that is two or more channels away from a broadcasting channel

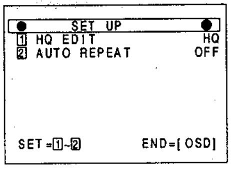
Example: If channel 58 and 60 are used for broadcasting, select video channel 56 or lower, or 62 or higher.



V- 62 ch

4 Tune the TV to the same channel as that selected in step 3 (in this example, channel 62).
(For tuning, refer to the TV's owner's manual.)
The following display will appear on the TV screen.

TV screen



● SET UP ●
1 HQ EDIT HQ
2 AUTO REPEAT OFF

SET =1~2 END=[OSD]

5 Fine-tune the TV so that the display is clearly visible.

If the display is clearly visible, the video channel setting is complete. Skip step 6 and go to step 7.

6 If interference noise occurs due to a nearby channel broadcast, repeat steps 3 to 5.

7 When the setting is complete, press the OSD button.

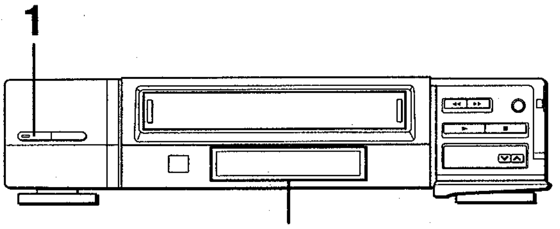
PRESETTING THE CHANNELS ON THE VTR

Receivable channels

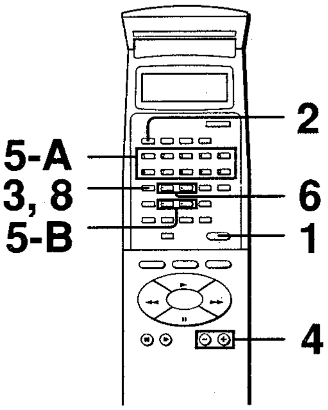
The VTR is capable of receiving the PAL B/G and SECAM B/G signals in the CCIR system.
The receivable channels are shown in the table on the right. The channels are classified by the two tuning ranges. Select the correct tuning range number on the VTR display. The channel numbers in the parentheses are indicated on the VTR display.

TV system	Tuning range	Band	TV channel number
PAL B/G SECAM B/G	1	VHF UHF CATV	E02 – E12 (02 – 12) E21 – E69 (21 – 69) X – Z (70 – 72)
	2	CATV	S01 – S41 (01 – 41)

To watch and record TV programmes, it is necessary to store the local TV stations in the memory of the VTR. You can preset up to 48 stations and select them easily.



VTR display


2
5-A
3, 8
6
5-B
1
4

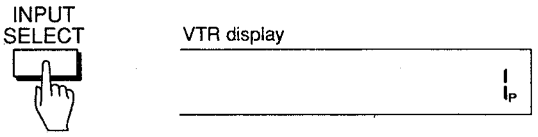
- The buttons to be used for channel presetting are marked with an orange dot on the upper left of each button.

Preset the desired channels following the procedures below:

1 Press the ON/STANDBY button to turn the VTR on.

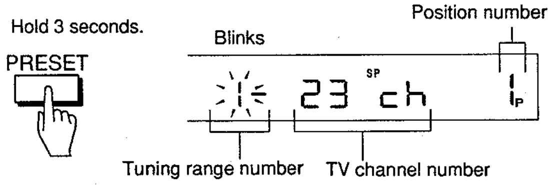
2 If the "L" indicator appears on the VTR display, press the INPUT SELECT button so that a channel position number appears.

Example: position number 1


INPUT SELECT
VTR display
1P

3 Press and hold the PRESET button for about 3 seconds.
The VTR enters the presetting mode.
The following display will appear on the VTR display.

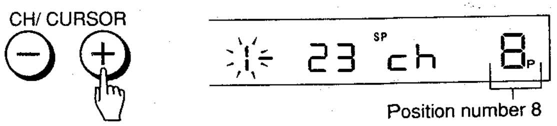
Example: when broadcast TV channel 23 is factory-preset on position number 1


Hold 3 seconds.
PRESET
Blinks
Position number
1
23
SP
ch
1P
Tuning range number
TV channel number

The display indicates the tuning range number, TV channel number and position number.
You can preset one channel on each position number.

4 Press the CH/CURSOR –/+ button to select the position number on which you want to preset a channel.

Example: to select position number 8

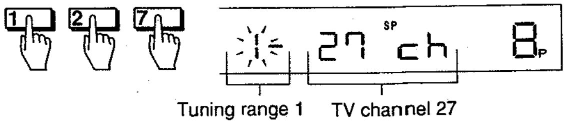

CH/ CURSOR
1
23
SP
ch
8P
Position number 8

5 Tune to the TV channel that you want to preset.
You can choose one of the two tuning methods.

5-A **Method 1: Direct tuning**

Press the number buttons (1 – 0).

Example: to preset broadcast TV channel 27 (whose tuning range is 1)


1
2
7
1
27
SP
ch
8P
Tuning range 1
TV channel 27

PRESETTING THE CHANNELS ON THE VTR

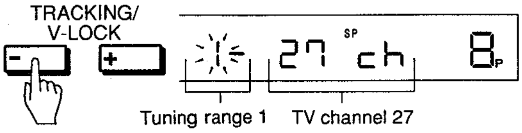
5-B **Method 2: Auto searching**

1) Press the TRACKING/V-LOCK –/+ button.
(The TRACKING/V-LOCK buttons function as the channel scan buttons in the presetting mode.)
Press the – button for lower-numbered channels, and the + button for higher-numbered channels.

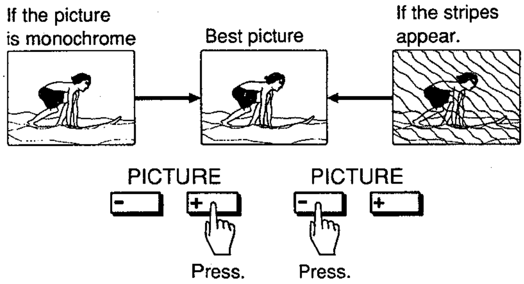
The VTR scans channels from the tuning ranges in sequence from 1 to 2, and stops scanning when a signal is received.

2) If the located channel is not the one you want, press the TRACKING/V-LOCK –/+ button again.
Repeat this procedure until the desired channel number appears.

Example: to preset broadcast TV channel 27



6 If the picture is not good, fine-tune the TV using the PICTURE –/+ buttons.
(The PICTURE buttons function as fine-tuning buttons in the presetting mode.)



7 Repeat steps 4 to 6 to preset other TV channels.

8 Press the PRESET button.
Channel presetting is now complete.

The VTR display returns to the previous mode.

Once channel presetting is done, you will select the TV channel by selecting the channel position number on which the desired TV channel is preset.

Skipping Channels

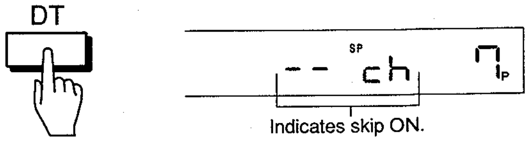
You can skip unnecessary channel memory positions when you select the channels with the CH/CURSOR –/+ buttons.

1 Press and hold the PRESET button for about 3 seconds.
The VTR enters the presetting mode.

2 Select the position number you want to skip with the CH/CURSOR –/+ buttons.

3 Press the DT button. (The DT button functions as a skip button in the presetting mode.)
The following display will appear on the VTR display and that particular position number will be skipped later when you press the CH/CURSOR –/+ buttons.

Example: to skip position number 7



By pressing the DT button again, the channel number appears and the skip function is cancelled.

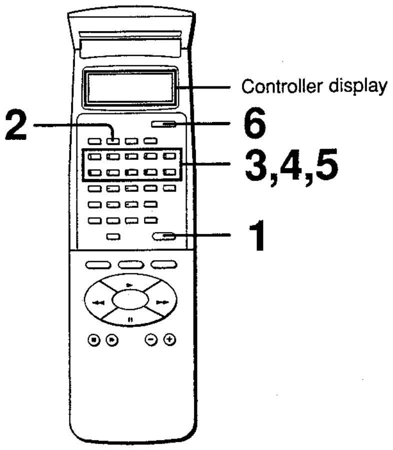
4 Press the PRESET button.
Channel skipping is now engaged.

To cancel channel skipping
The procedure is the same as that for channel skipping. 1) Press PRESET for 3 seconds, 2) select the position number you want to cancel skipping, 3) press DT and 4) press PRESET again.

Note
You can switch the skip function on/off only when the channels have been preset. It is not possible while auto searching.

SETTING THE CLOCK

When the VTR is first connected to the AC socket, or after a power failure, 00:00 blinks on the VTR display and setting the clock is necessary.
Set the clock data (time/day/month/year) on the remote controller and transmit it to the VTR.


Controller display
2
6
3,4,5
1

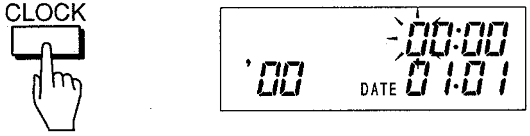
Hints on setting
- *The item to be set will blink. Set the data with the number buttons, following the blinking position. You can change the blinking position by pressing the CH/CURSOR –/+ buttons.*
- *During setting, proceed to each succeeding step within 5 minutes. Otherwise the clock setting mode may be released automatically.*

Clock Setting Procedure

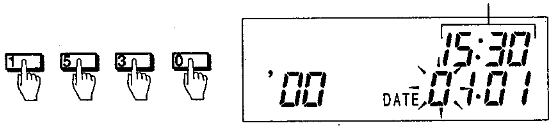
Example: to set the clock to 15:30 on June 20, 1992

1 Press the ON/STANDBY button to turn the VTR on.

2 Press the CLOCK button.
The remote controller enters the clock setting mode.
The following display will appear on the controller display.

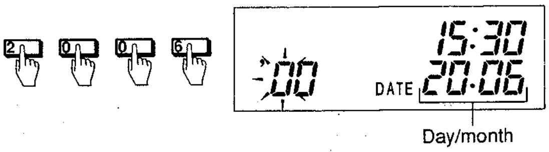

Controller display
CLOCK
00:00
'00
DATE 01·01

3 Set the hours and minutes.
Press number buttons 1, 5, 3 and 0.

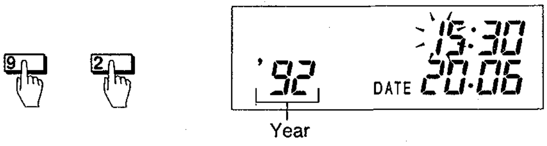

Hour/minutes
1
5
3
0
15:30
'00
DATE 01·01

Correcting a mistake:
Press the CH/CURSOR – button repeatedly until the number you set incorrectly blinks. Press the correct number button and then press the CH/CURSOR + button to return to the previous digit.

4 Set the day and month.
Press number buttons 2, 0, 0 and 6.

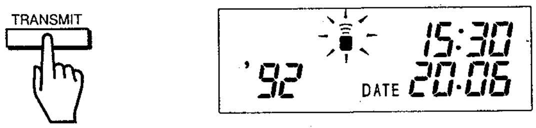

2
0
0
6
15:30
'00
DATE 20·06
Day/month

5 Set the year.
Press number buttons 9 and 2 (lower two digits of the year).


9
2
15:30
'92
DATE 20·06
Year

The clock is now set on the remote controller.

6 Point the remote controller towards the VTR and press the TRANSMIT button.
The ▮ (transmit) indicator blinks for about 2 seconds, and the clock data is transmitted to the VTR.

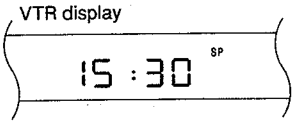

TRANSMIT
15:30
'92
DATE 20·06

Now the clock on the VTR starts.

SETTING THE CLOCK

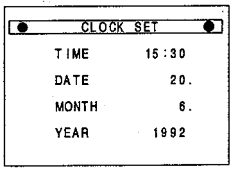
Confirm the display.

VTR display



The clock is displayed for a while and then the previous display will be resumed.

TV screen



CLOCK SET

TIME 15:30
DATE 20.
MONTH 6.
YEAR 1992

The CLOCK SET screen appears for a while and then the normal screen will be resumed.

To release the clock setting mode on the remote controller
Press the CLOCK button again.
The clock data is cleared.

Notes

- You cannot transmit the clock data to the VTR during the timer recording or timer standby modes.
- The VTR does not receive irregular clock data.

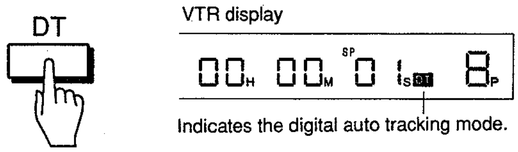
Correcting the VTR Clock

If a short power failure has occurred, the colon between the hour and minute digits on the VTR display blinks. In this case, you must set the VTR clock again.
Set the clock on the remote controller and press the TRANSMIT button to transmit the clock data to the VTR.

Adjusting the Tracking

Digital auto tracking
With the digital auto tracking function, the VTR automatically adjusts the tracking for a clear picture and sound. Normally use the auto tracking adjustment mode.

1. During playback, press the DT button.
   The DT indicator blinks on the VTR display, and the digital auto tracking adjustment starts.
   You do not need to press the DT button, if the DT indicator is already blinking on the display.

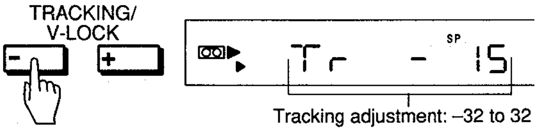


Indicates the digital auto tracking mode.

2. When the auto tracking adjustment is finished, the DT display stops blinking.

Adjusting the tracking manually
If you cannot obtain the best possible tracking point using the digital auto tracking function, adjust the tracking manually.

1. During playback, press the TRACKING/V-LOCK –/+ buttons.
   The DT indicator goes off.
2. Adjust the tracking using the TRACKING/V-LOCK –/+ buttons.



Tracking adjustment: –32 to 32

3. Monitor the picture while pressing the TRACKING/V-LOCK –/+ buttons.
   When the picture and sound are best, release the button.
   After a few seconds, the tracking adjustment mode will end and the display will revert to normal.

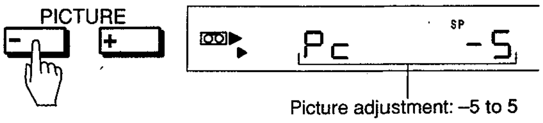
To reset the tracking to the center "00" point
Press the TRACKING/V-LOCK –/+ buttons simultaneously.

Note
The noise on the screen may not be completely removed depending on the tape used, especially when the tape has been recorded on another VTR.

Adjusting the Picture

Adjusting the sharpness
You can make the picture softer or sharper.

1. During playback, press the PICTURE –/+ button.
2. Press the PICTURE –/+ button within 3 seconds to adjust the sharpness.



Picture adjustment: –5 to 5

To reset the sharpness to the center "0" point
Press the two PICTURE buttons simultaneously.

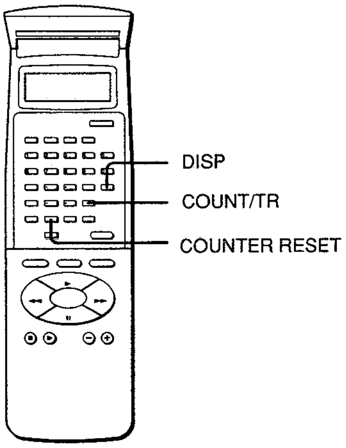
Reducing the playback noise (PNR Function)
When playing back a rental video or a copied tape, the picture may be very noisy. In this case, press the PNR button to turn on the PNR indicator on the VTR display. PNR (Picture Noise Reduction) is activated to reduce the noise.
In normal use, press the PNR button again to turn off the PNR indicator.

Note
The picture sharpness adjustment cannot be done in the PNR mode.

PLAYBACK

Changing the Counter Display

You can see the clock, linear tape counter, cassette type (length) or tape time remaining on the VTR display and TV screen. The COUNT/TR button switches the display.



- To display the counter on the TV screen, press the DISP button. To make it disappear, press the DISP button again.

Each time you press the COUNT/TR button, the display changes cyclically as follows:

	VTR display	TV screen
(a) Clock	15 :30 SP Press COUNT/TR.	15:30
(b) Linear time counter	1H 25M 00S SP Press COUNT/TR.	1H25M00S
(c) Cassette type	E 180 SP Press COUNT/TR.*	TR 1H30M
(d) Tape time remaining	TR 1H 30M SP Press COUNT/TR.	TR 1H30M
(a) Clock	Clock	Clock

* The tape time remaining appears automatically without pressing COUNT/TR after the cassette type is displayed for 6 seconds.

To reset the linear time counter (b) to 0H00M00S
The counter is automatically reset to 0H00M00S when a cassette is loaded. If you want to reset the counter at some other point, for example, when you start a new recording, just press the COUNTER RESET button.

To adjust the cassette type (c) display
Normally the VTR detects the cassette type automatically. If the displayed cassette type is not correct for the cassette inserted, change the cassette type display. This adjustment is necessary for a reliable tape time remaining display because the VTR calculates it according to the cassette type.
While the cassette type is displayed, press the CH/CURSOR + button. The display changes in the following order:

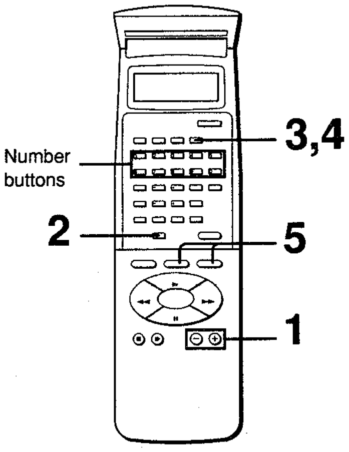
E030 → E060 → E090 → E120 → E150 → E180 → E195 → E200 → E210 → E240
↑

- If you load a VHS-C (compact)-type cassette using a C cassette adaptor, the cassette type display shows "C" only. The display can be changed to, for example, "E030" with the CH/CURSOR + button, but the "C" indicator will not be obtained again.

Notes on the time remaining display (d)
- The displayed time remaining is an approximate time.
- The time remaining is calculated according to the tape speed (SP or LP mode) and the cassette type.

ONE-TOUCH TIMER RECORDING

Using the OTR (One-touch Timer Recording) function, you can start recording immediately, and stop the recording and turn the VTR off at a desired time within 12 hours in 30-minute increments.

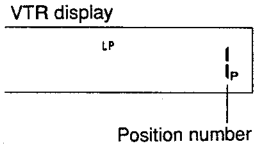


Preparation

- *Check that the clock time is correct.*
- *Load a cassette with the safety tab attached.*
  (Press the ON/STANDBY button if the power is off with a cassette loaded.)

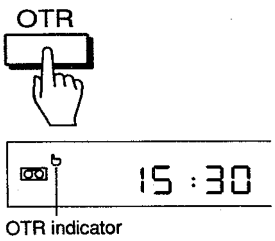
Example: to record channel 25 (preset on position 1) in the SP mode from now (15:00) until 16:00

1 Select the position number on which channel 25 is preset using the CH/CURSOR –/+ button or number buttons.

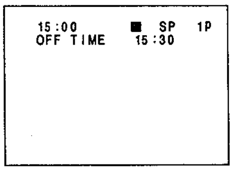


2 Press the SP/LP button to select the SP mode.

3 Press the OTR button.
The VTR enters the OTR mode.

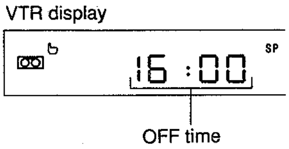


TV screen

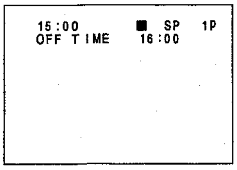

15 :00 ■ SP 1P
OFF TIME 15 :30

4 Within 10 seconds, press the OTR button to set the OFF (recording stop) time.
Each time the button is pressed, the OFF time changes in 30-minute increments.

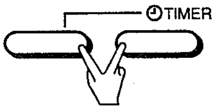
Example: to stop recording at 16:00



TV screen


15 :00 ■ SP 1P
OFF TIME 16 :00

5 Within 10 seconds, press the two TIMER buttons simultaneously.
One-touch timer recording begins.



The recording will stop at the preset OFF time.
The VTR will automatically enter the timer standby mode.

To cancel the one-touch timer recording midway
Press the two TIMER buttons simultaneously or press the ON/STANDBY button.

PROGRAMMABLE TIMER RECORDING

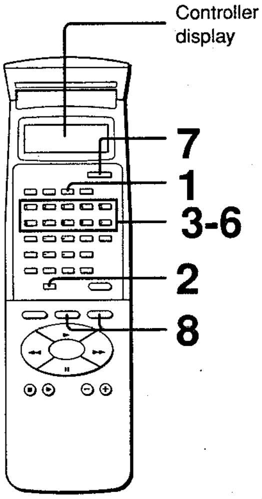
Using the programmable timer, you can record up to 8 different programmes over one year.
Set timer programmes on the remote controller display and transmit them one by one to the VTR.

Hints on setting

- *The item to be set blinks. Set the data with the number buttons, following the blinking position. (The tape speed does not blink.)*
  If you want to correct the data, change the blinking position by pressing the CH/CURSOR –/+ buttons.
- *During setting, proceed to each succeeding step within 5 minutes. Otherwise the timer programme display is automatically released.*

Preparation

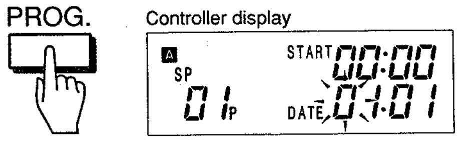
- *Check that the clock time is correct.*
- *Load a cassette with the safety tab attached.*
  (Press the ON/STANDBY button if the power is off with a cassette loaded.)


Controller display
7
1
3-6
2
8

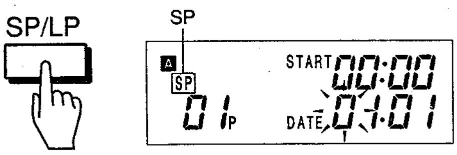
Setting the Timer Programme

Example: to record channel 27 (preset on position number 8) in the SP mode from 20:15 until 21:15 on June 23. Today is June 20.

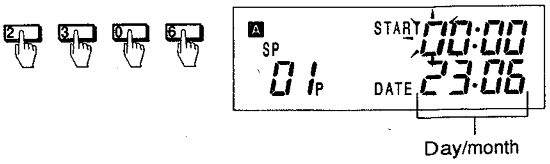
1 Press the PROG. button.
The remote controller enters the timer programming mode.


PROG.
Controller display
A
SP
01 LP
START 00:00
DATE 01·01

2 If the LP indicator is displayed, press the SP/LP button to select the SP mode. (If not, skip this step.)

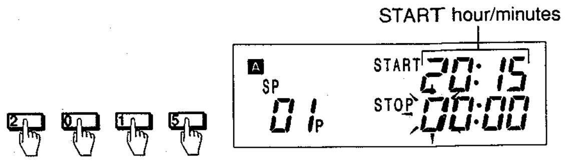

SP/LP
SP
A
SP
01 LP
START 00:00
DATE 01·01

3 Set the recording date (day and month).
Press number buttons 2, 3, 0 and 6. (Pressing 0 is necessary.)


2
3
0
6
A
SP
01 LP
START 00:00
DATE 23·06
Day/month

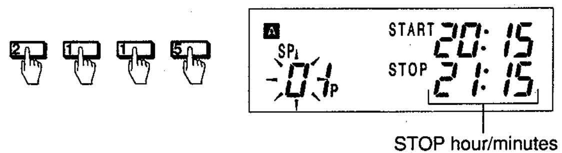
Correcting a mistake:
Press the CH/CURSOR – button to reverse the blinking position until the number you set incorrectly blinks. Correct the number with the number buttons and press the CH/CURSOR + button to return the blinking digit.

4 Set the recording START time (hour and minutes).
Press number buttons 2, 0, 1 and 5.

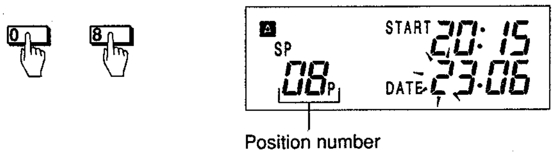

START hour/minutes
2
0
1
5
A
SP
01 LP
START 20:15
STOP 00:00

PROGRAMMABLE TIMER RECORDING

5 Set the recording STOP time (hour and minutes).
Press number buttons 2, 1, 1 and 5.

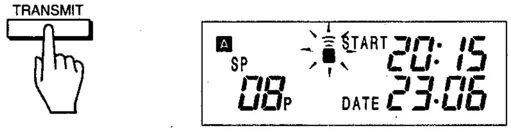

2
1
1
5
A
SP
START 20:15
01P
STOP 21:15
STOP hour/minutes

6 Select position number 8 on which channel 27 is preset.
Press number buttons 0 and 8.


0
8
A
SP
START 20:15
08P
DATE 23·06
Position number

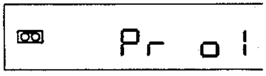
The programme is now set in memory A on the remote controller.

7 Point the remote controller towards the VTR and press the TRANSMIT button.
The ⍑ (transmit) indicator blinks for about 2 seconds, and the programme data is transmitted to the VTR.


TRANSMIT
A
SP
START 20:15
08P
DATE 23·06

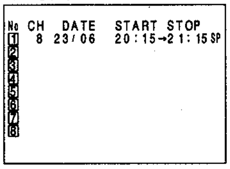
Confirm the display.

VTR display



The programme number blinks for about 4 seconds on the VTR display and then the previous display will be resumed.

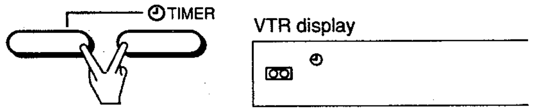
TV screen



```
No CH  DATE  START STOP
1   8 23/06  20:15→21:15SP
2
3
4
5
6
7
8
```

The confirmation screen appears for about 4 seconds and then the normal screen will be resumed.

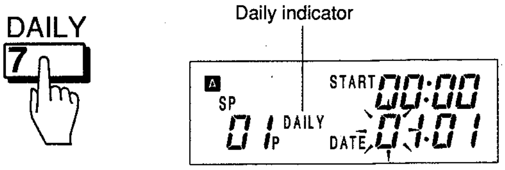
8 Press the two TIMER buttons simultaneously.
The VTR enters the timer standby mode.


⊙TIMER
VTR display

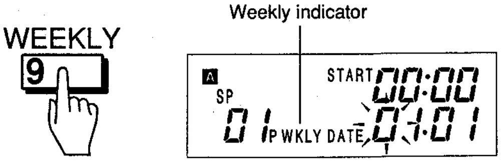
Recording will begin at the preset time on the preset day. When the recording is complete, the VTR will automatically enter the timer standby mode.

Note
The VTR does not receive irregular programme data.

Daily timer recording
You can record TV programmes on the same TV channel at the same hour every day.
When you set the timer programme following "Timer Programme Setting" procedures on page 22: Before setting the date (step 3), press the DAILY button.


DAILY
7
Daily indicator
A
SP
START 00:00
01P
DAILY
DATE 01·01

Weekly timer recording
You can record TV programmes on the same TV channel on the same day every week.
When you set the timer programme following "Timer Programme Setting" procedures : Before setting the date (step 3), press the WEEKLY button.

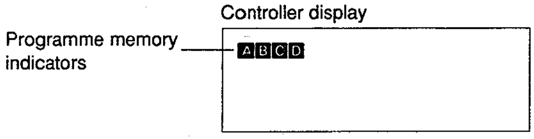

WEEKLY
9
Weekly indicator
A
SP
START 00:00
01P
WKLY
DATE 01·01

Recording from an external programme source
You can record a programme from the external source connected to the AUDIO/VIDEO connector on the rear panel.
When you set the timer programme following "Timer Programme Setting" procedures . Before setting the SP/LP mode (step 2), press the INPUT SELECT button to display the L indicator on the controller display. Then perform steps 2 to 5, 7, and 8. Selecting a TV channel (step 6) is not necessary.

To cancel the timer programming mode
While setting a timer programme on the remote controller, you can cancel the timer programming mode instantly.
Press the PROG. button repeatedly until the timer programme display disappears from the controller display.
The timer programming mode is cancelled, and you can use the number buttons and the CH/CURSOR –/+ buttons for selecting channels. (The programme memory indicator changes A → B → C → D → no indicator, each time the PROG. button is pressed.)

Setting Two or More Timer Programmes

The remote controller can store up to 4 programmes in memories A to D.
To set 2 to 4 timer programmes on the VTR, proceed as follows:



Preparation: *If the VTR is in the timer standby mode (⏲ indicator lit), press the TIMER buttons to release it and press the ON/STANDBY button.*

1 Press the PROG. button to select one of the memories A to D.
Each time the button is pressed, the programme memory indicator changes
A → B → C → D → no indicator → A...

2 Set the desired programme following steps 1 to 6 of "Setting the Timer Programme".

3 Repeat steps 1 and 2 above if you want to set more programmes in other memories.

4 After setting all the programmes, press the PROG. button to select the desired memory.

5 Press the TRANSMIT button.
The programme data stored on the selected memory is transmitted to the VTR.

6 Transmit other programmes one by one repeating steps 4 and 5 above.

7 Press the two TIMER buttons simultaneously to set the VTR to the timer standby mode.

To set 5 to 8 programmes
First transmit the programmes in memories A to D as described above and set up to four new programmes on the remote controller. Transmit them and set the VTR to the timer standby mode in the same way.

To cancel the programme data set on the remote controller

1 Press the PROG. button to select the memory (A – D) on which the programme to be cancelled is stored.

2 Press the CLEAR button.

Notes
- When you set a new programme, the previous programme data set on the same memory is erased.
- If the VTR receives more than 8 programmes, the "FULL" indicator appears on the VTR display and all the programme numbers on the TV screen blink.

Confirming/Cancelling/Changing the Timer Programmes

Confirming the timer programmes
Press the OSD button in the timer standby mode or during timer recording.
The programme confirmation screen appears.
The confirmation screen will disappear automatically in about one minute.

Cancelling the timer programmes set on the VTR *(Remote controller operated)*

Preparation: *If the VTR is set to the timer standby mode (⏲ indicator lit), press the TIMER buttons to release it and press the ON/STANDBY button.*

1 Press the OSD button.
The MENU screen appears on the TV.

2 If a timer programme is displayed on the controller display with the A to D programme memory indicator, press the PROG. button repeatedly until the timer programme display disappears.

3 Press number button 2.
The PROG. CONFIRM screen appears.

4 Using the number buttons, select the programme number whose data you want to cancel.
The selected programme data is cleared.

5 Press the OSD button again.

6 If necessary, press the TIMER buttons to return the VTR to the timer standby mode.

PROGRAMMABLE TIMER RECORDING

Changing the timer programme set on the VTR

Preparation: *If the VTR is set to the timer standby mode (⊕ indicator lit), press the TIMER buttons to release it and press the ON/STANDBY button.*

1 Cancel the programme whose data you want to change following "Cancelling the timer programmes set on the VTR" on page 24.

2 Set a new programme on the remote controller, transmit it to the VTR as described.

3 If necessary, press the TIMER buttons to return the VTR to the timer standby mode.

Recording or Playback in the Timer Standby Mode *(Remote controller operated)*

When you want to use the VTR while it is set to the timer standby mode, proceed as follows:

1 Press the TIMER buttons.
The ⊕ indicator goes off and you can operate the VTR as usual.

2 After using the VTR, press the TIMER buttons again.
The VTR returns to the timer standby mode.

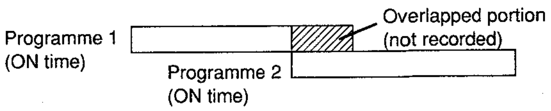
Note
Finish normal use of the VTR before the preset recording start time, since the timer only works when the VTR is in the timer standby mode.

Additional Information on Timer Recording

Error indicator
The "E" (error) indicator appears on the VTR display if you pressed the TIMER buttons when:
— a cassette without a safety tab is loaded.
— a cassette with a safety tab is loaded and no timer programmes are set on the VTR.
In these cases, a recording will not be made.

Overlap of the programmes
If two timer programmes overlap, the recording ON time of programme 2 has priority over the recording OFF time of programme 1.

Example: when programme 2 overlaps programme 1



If a power failure occurs during timer recording
- After a short power failure, the colon between the hour and minute digits blinks on the VTR display. This indicates that the timer programmes are still in the memory of the VTR.
- After a long power failure, 00:00 blinks on the VTR display. This indicates that the timer programmes have been cleared. Reset the clock and timer programmes on the VTR.

Calendar Display *(Remote controller operated)*

You can see a calendar on the TV screen.

1 Press the OSD button.
The MENU screen appears on the TV.

2 If a timer programme is displayed on the controller display with the A to D programme memory indicator, press the PROG. button repeatedly until the timer programme display disappears.

3 Press number button 3.
The calendar of the current month appears with the current day blinking.

4 Press the CH/CURSOR –/+ button to see the previous or next month.

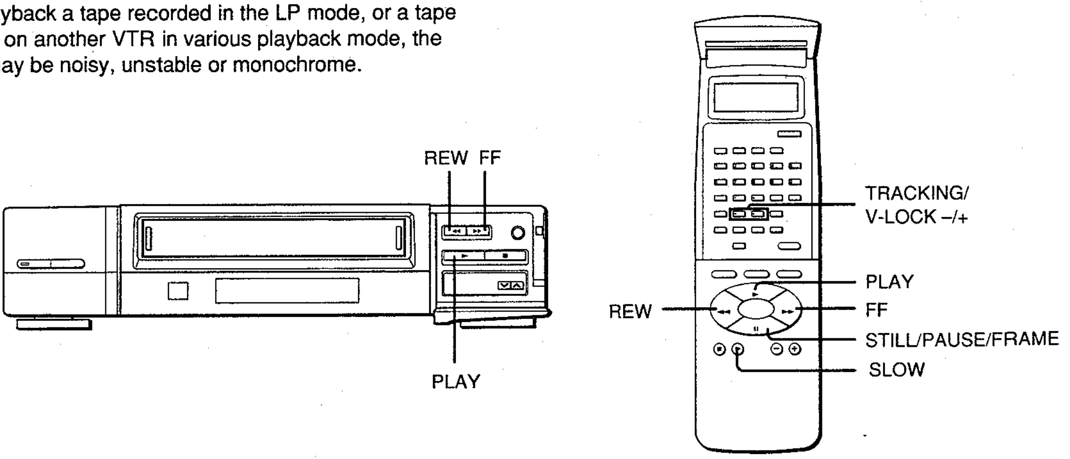
5 Hold down the CH/CURSOR –/+ button to see the previous or next year.
The calendar screen can display from 1900 to 2099.

6 Press the OSD button again.
The calendar display disappears.

ADVANCED OPERATION

PLAYBACK IN VARIOUS MODES

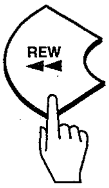
Note
If you playback a tape recorded in the LP mode, or a tape recorded on another VTR in various playback mode, the picture may be noisy, unstable or monochrome.



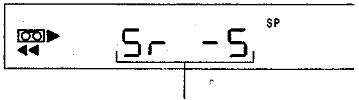
Variable Picture Search

1 During playback, press the REW or FF button.
The tape runs at 5 times the normal playback speed.

Example: when the REW button is pressed

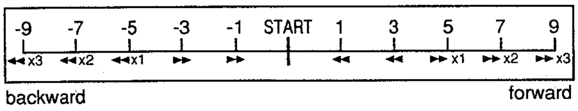


VTR display



Search indicator (displayed for about 6 seconds) "–" means the reverse direction.

2 Select the speed by pressing the REW or FF button, if necessary.
Each time you press the REW or FF button, the speed changes as follows:



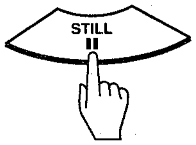
Pressing a button in the opposite direction reduces the speed in steps as in the above diagram.

Example:
1 Press FF. The speed becomes 5 times the normal speed and "Sr 5" appears on the VTR display.
2 Press REW. The speed changes to 3 times the normal speed and the display changes to "Sr 3".

Note
The picture will have some interference stripes. This is not a defect in the unit.

Still Picture

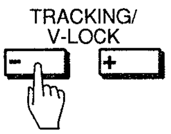
1 During playback, press the STILL/PAUSE/FRAME button.
The picture freezes.



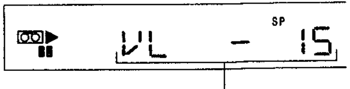
2 To resume normal playback, press the PLAY button.

The still picture mode will be released automatically after approximately 5 minutes. The VTR will then shift to the normal playback mode.

Adjusting still picture stability
If the still picture is distorted or flickers, hold down the TRACKING/V-LOCK –/+ button until the picture becomes stable.



VTR display



Still stability indicator: –32 to 32

The display will revert to the previous mode after 3 seconds.

Notes
- The distortion of the still picture may not be eliminated completely if the tape has been recorded on another VTR.
- The still picture may shake if a picture of a fast-moving object or scene is frozen. This is not a defect in the unit.
- If noise appears in the still picture, adjust the tracking manually in the slow-motion picture mode.

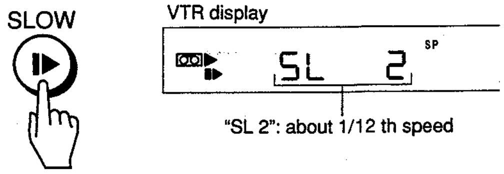
PLAYBACK IN VARIOUS MODES

Frame Advance

1. During playback, press the STILL/PAUSE/FRAME button to put the VTR in the still picture mode.
2. Press the STILL/PAUSE/FRAME button again. The picture advances one frame.
   - Each time you press the STILL/PAUSE/FRAME button, the picture advances one frame.
   - When the button is held down, the tape runs at 1/6 times the normal playback speed.
3. To resume normal playback, press the PLAY button.

Slow-motion Picture

1. During playback, press the SLOW button. The tape will run at about 1/12 times the normal playback speed.

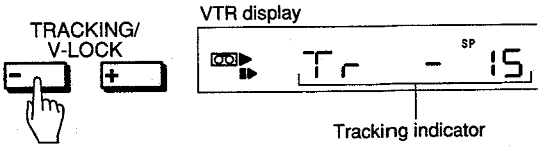


"SL 2": about 1/12 th speed

2. Change the slow-motion speed, if necessary.
   - For a faster (1/6th) speed, press the FF button. "SL3" will be displayed.
   - For a slower (1/24th) speed, press the REW button. "SL1" will be displayed.
   - To resume 1/12th speed, press the SLOW button. "SL2" will be displayed.
3. To resume normal playback, press the PLAY button.

   The slow-motion picture mode will be cancelled automatically after approximately 5 minutes. The VTR will then shift to the normal playback mode.

Adjusting the tracking in the slow-motion mode
If the slow-motion picture is noisy, hold down the TRACKING/V-LOCK –/+ button until the best picture is obtained.



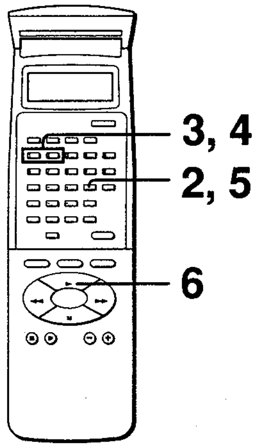
Tracking indicator

The display will revert to the previous mode after 3 seconds.

Notes
- The slow-motion picture may flicker up and down. This is not a defect in the unit.
- The noise in the slow-motion picture may not be eliminated completely by the tracking adjustment.

Auto Repeat Playback

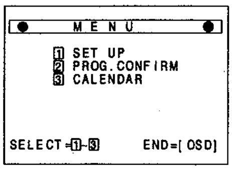
The VTR can repeat playback from the beginning to the end of a tape 10 times.



1 Load a cassette.

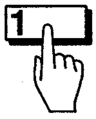
2 Press the OSD button.
The MENU screen appears on the TV.

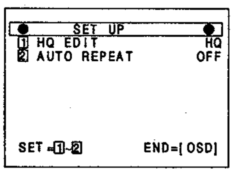
TV screen



MENU
1 SET UP
2 PROG.CONFIRM
3 CALENDAR
SELECT=1-3 END=[OSD]

3 Press number button 1.
The SET UP screen appears.





SET UP
1 HQ EDIT HQ
2 AUTO REPEAT OFF
SET=1-2 END=[OSD]

Note
Number 2 is not displayed when no cassette is loaded, or the VTR is in the recording or recording pause mode.

4 Press number button 2 so that AUTO REPEAT is set to ON.
The ↻ indicator appears on the VTR display.

5 Press the OSD button twice.
The TV screen returns to the normal screen.

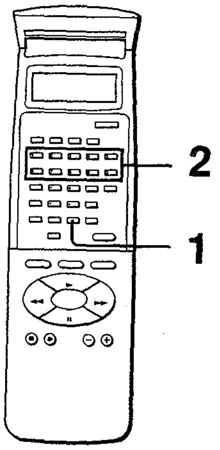
6 Press the PLAY button.
Playback will begin.

When the tape reaches its end during playback, it will rewind to the beginning and playback will resume. After playback and rewind are repeated 9 times, the auto repeat function stops. The tape stops at the end of the 10th playback.
The auto repeat mode is cancelled automatically.

To cancel the auto repeat mode midway
Press the REC button, EJECT button or ON/STANDBY button.

GO-TO FUNCTION

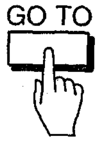
You can wind the tape to a desired point specified by either the linear time counter reading or the time remaining.

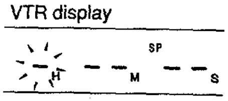


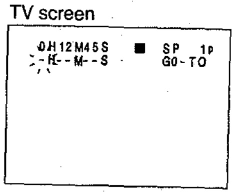
Selecting a Target Point with the Linear Time Counter

Example: To select a target reading of 1H23M45S when the current reading is 0H12M45S

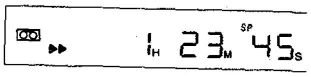
1 Press the GO TO button once.
The following display appears.

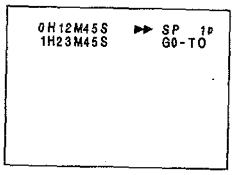



VTR display
SP
-H --M --S


TV screen
0H12M45S ■ SP 1P
-H--M--S GO-TO

2 Within 10 seconds, input the target reading.
Press number buttons 1, 2, 3, 4 and 5.


▶▶
SP
1H 23M 45S


0H12M45S ▶▶ SP 1P
1H23M45S GO-TO

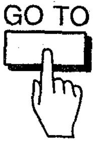
The tape is automatically fast forwarded and stopped when the linear time counter reads 1H23M45S.

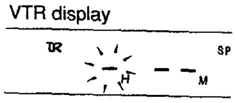
Note
If you specify a target reading that is smaller than the current reading, for example, the target is 0H05M15S when the current reading is 0H12M45S, the tape will rewind to the target point.

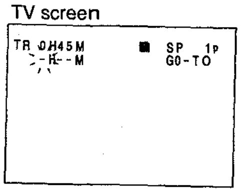
Selecting a Target Point by the Time Remaining

Example: To select a target time remaining of 1H45M when the current time remaining is 0H45M

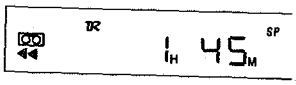
1 Press the GO TO button twice.
The following display appears.

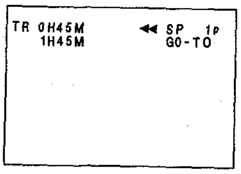



VTR display
TR
SP
-H --M


TV screen
TR 0H45M ■ SP 1P
-H--M GO-TO

2 Within 10 seconds, select the target time remaining.
Press number buttons 1, 4 and 5.



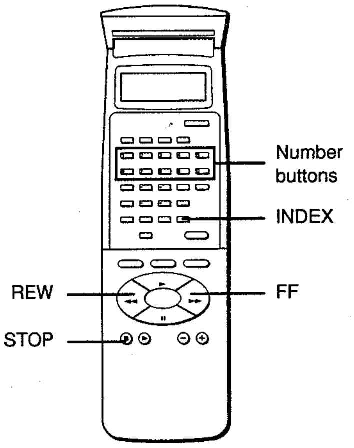

TR 0H45M ◀◀ SP 1P
1H45M GO-TO

The tape is automatically rewound and stopped when the time remaining reads 1H45M.

Note
If you specify a target time remaining that is smaller than the current time remaining, for example, the target is 0H30M when the current time remaining is 0H45M, the tape will be fast forwarded to the target point.

INDEX SEARCH OPERATION

You can easily locate the desired programme using the index signal registered on the tape.

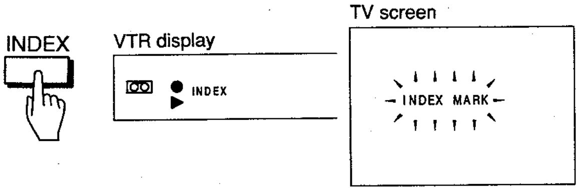

Number buttons
INDEX
REW
FF
STOP

Registering Index Signals

Registering the index signals automatically
An index signal is automatically registered when a recording starts.
An index signal is also registered when one-touch timer recording or programmed timer recording starts.

Note
An index signal is not registered automatically when the VTR is in the recording pause mode and recording restarts.

Registering the index signals manually
During recording, index signals can be manually registered at desired points on the tape.
Press the INDEX button at the desired point.


TV screen
INDEX
VTR display
INDEX
INDEX MARK

The INDEX indicator blinks for about 3 seconds.

"INDEX MARK" blinks on the TV screen.

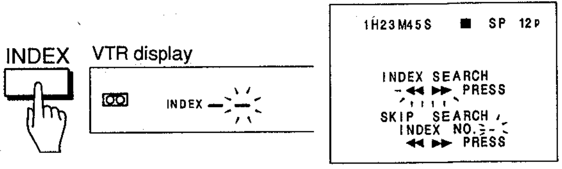
Notes
- When registering two or more index signals, certain intervals are required: more than 1 minute in the SP mode and more than 3 minutes in the LP mode.
- Up to 99 index signals can be registered on a tape.

Index Search

This function plays the tape back for about 7 seconds at each index signal.

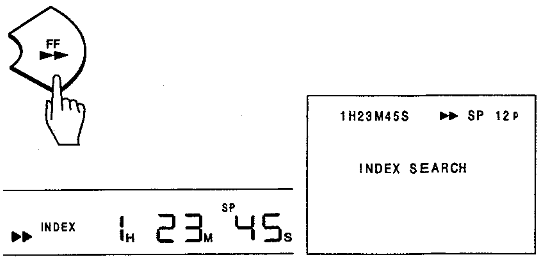
1 Load a cassette with the index signals registered.

2 Press the INDEX button while in the stop or playback mode.
(In the stop mode, display a TV programme on the TV screen.)


TV screen
INDEX
VTR display
INDEX
1H23M45S ■ SP 12P
INDEX SEARCH
◀◀ ▶▶ PRESS
SKIP SEARCH
INDEX NO.
◀◀ ▶▶ PRESS

3 Within 10 seconds, press the FF or REW button.
The following display appears.

Example: when the FF button is pressed


FF
▶▶ INDEX 1H 23M SP 45S
1H23M45S ▶▶ SP 12P
INDEX SEARCH

The VTR fast forwards or rewinds the tape. When an index signal is found, the VTR plays back the tape for 7 seconds, and then resumes fast forwarding or rewinding. This operation is repeated at each index signal.

INDEX SEARCH OPERATION

4 Press the PLAY button when the desired programme is found.
Normal playback begins.

5 Press the STOP button to stop playback.

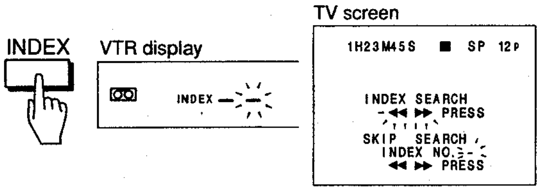
Note
If you registered the index signals on a tape recorded on another VTR, the recording may be blurred and the index search may not work correctly.

Skip Search

This function fast forwards or rewinds the tape to the point at which the selected index signal is registered, and starts playback from there.

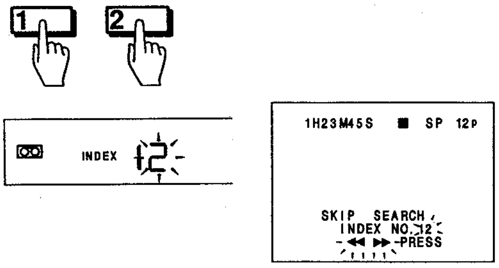
1 Load a cassette with the index signals registered.

2 Press the INDEX button while in the stop or playback mode.
(In the stop mode, display a TV programme on the TV screen.)


TV screen
INDEX
VTR display
INDEX
1H23M45S ■ SP 12P
INDEX SEARCH
◄◄ ►► PRESS
SKIP SEARCH
INDEX NO.
◄◄ ►► PRESS

3 Within 10 seconds, press the number buttons to select the index signal which is registered at the beginning of the desired programme. (For locating the index signals, see below.)

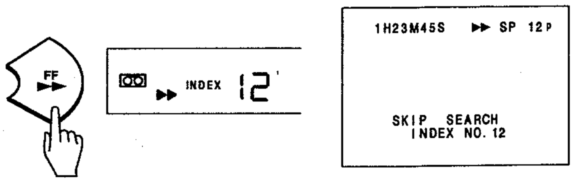
Example: to select index number 12


1
2
INDEX 12
1H23M45S ■ SP 12P
SKIP SEARCH
INDEX NO.12
◄◄ ►► PRESS

4 Within 10 seconds, press the FF or REW button.

- Press the FF button if the desired programme is in the forward direction.
- Press the REW button if the desired programme is in the backward direction.

Example: when the FF button is pressed


FF
►►
►► INDEX 12
1H23M45S ►► SP 12P
SKIP SEARCH
INDEX NO. 12

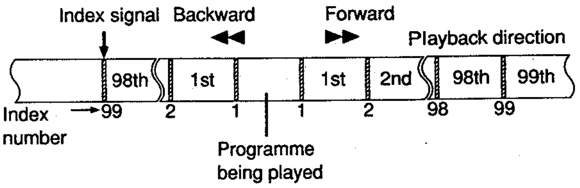
The VTR fast forwards or rewinds the tape. Each time an index signal is skipped, the displayed index number will decrease by one.
When the VTR detects the selected index signal, it automatically enters the playback mode.

5 Press the STOP button to stop playback.

Notes

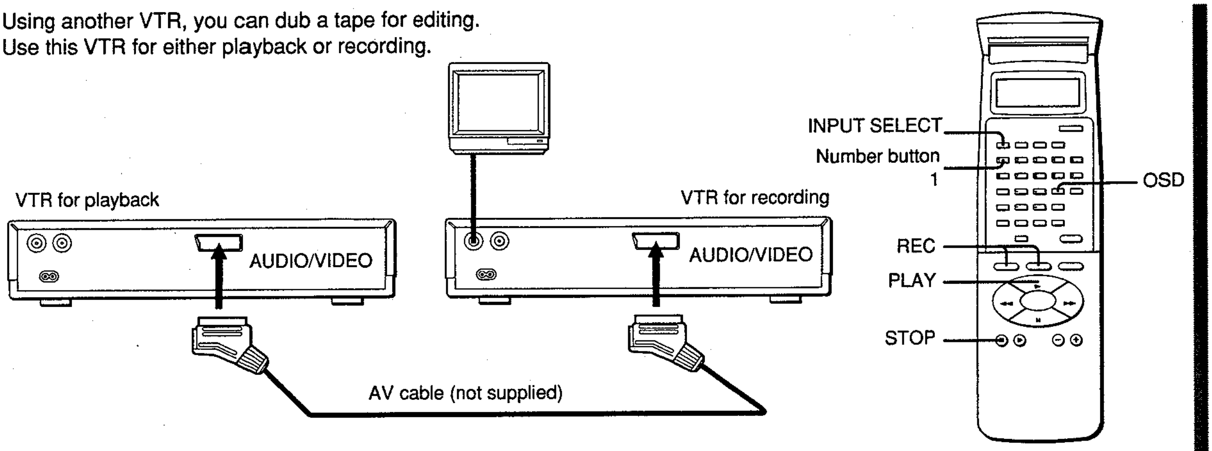
- The skip search stops when the PLAY or STOP button is pressed.
- The index signal registered at the very beginning of the tape may not be detected.

Locating the index signals
You can locate up to 99 index signals backward or forward during a skip search.


Index signal
Backward
◄◄
Forward
►►
Playback direction
98th
1st
1st
2nd
98th
99th
Index number
99
2
1
1
2
98
99
Programme being played

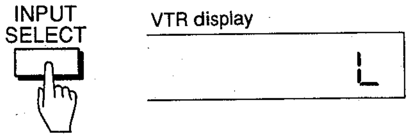
TAPE COPYING

Using another VTR, you can dub a tape for editing.
Use this VTR for either playback or recording.



Using this VTR for recording

1. Connect the AUDIO/VIDEO socket of this VTR to the audio/video (SCART) socket of another VTR.
2. Press the INPUT SELECT button of this VTR's remote controller.
   The "L" (line input) indicator appears on the VTR display.



3. Play the tape on the other VTR for playback and press the REC button to start recording on this VTR.
4. Press the stop button on each VTR when copying is finished.

Using this VTR for playback

1. Connect the AUDIO/VIDEO socket of this VTR to the audio/video (SCART) socket of another VTR.
2. Set HQ/EDIT to EDIT on the SET UP screen. (See "Selecting the EDIT mode".)
3. Select the L (line) input on the other VTR for recording.
4. Press the PLAY button on this VTR and start recording on the other VTR for recording.
5. Press the stop button on each VTR when copying is finished.

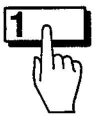
Note
The picture quality of the copied tape is slightly lower than the original.

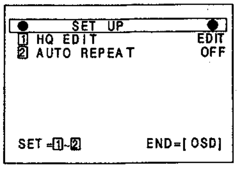
Selecting the EDIT mode

The EDIT mode reduces deterioration of the picture quality of the tape copy.

Important
Make sure that the PNR indicator is turned off on the VTR display. If it is displayed, you cannot select the EDIT mode.

1. Press the OSD button.
   The MENU screen appears on the TV.
2. Press number button 1.
   The SET UP screen appears.
3. Press number button 1 so that HQ/EDIT is set to EDIT.





```
●          SET  UP          ●
1 HQ EDIT               EDIT
2 AUTO REPEAT            OFF

SET =1~2           END=[OSD]
```

4. Press the OSD button twice.
   The TV screen returns to the normal screen.

When copying is completed
Be sure to reset HQ/EDIT to HQ. If it is set to EDIT, the playback picture quality is not good.

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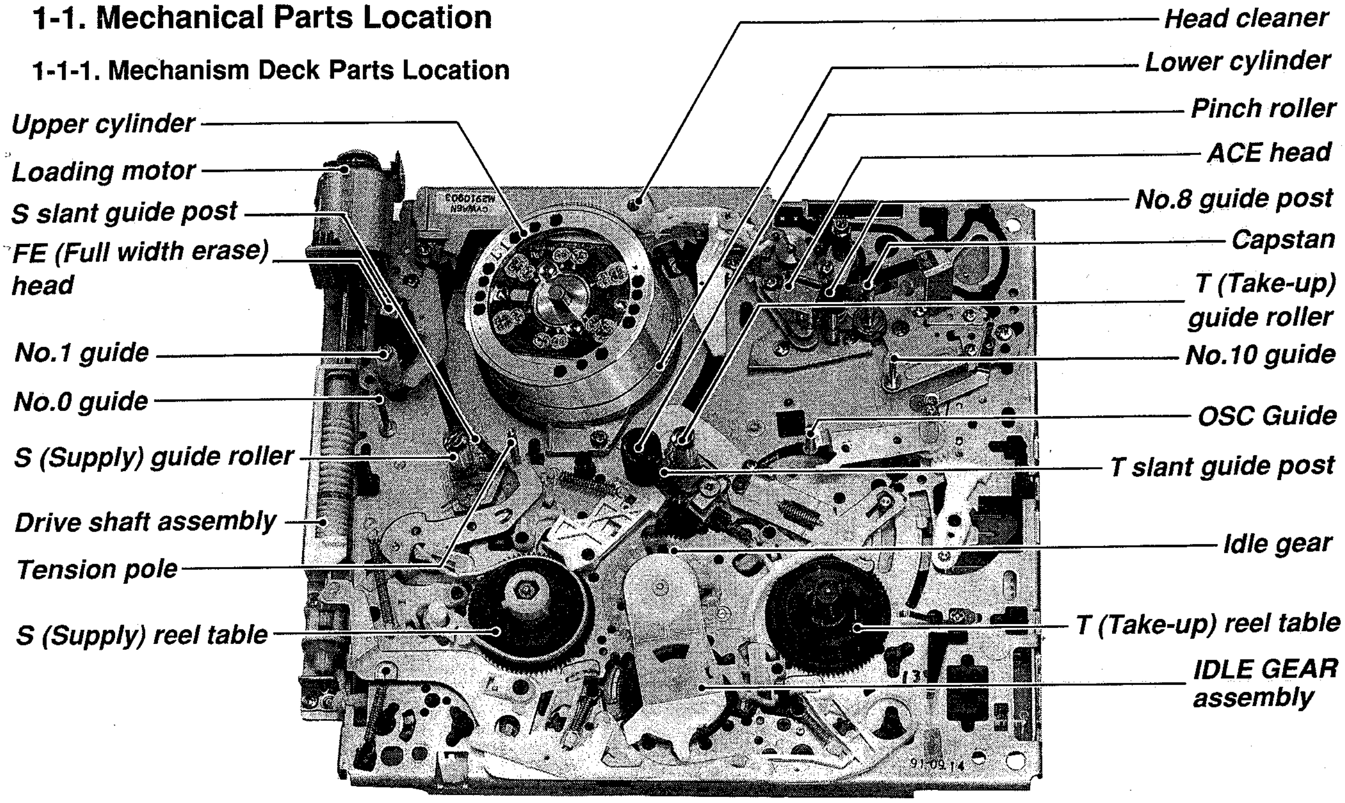
SECTION 2
ADJUSTMENT PROCEDURES

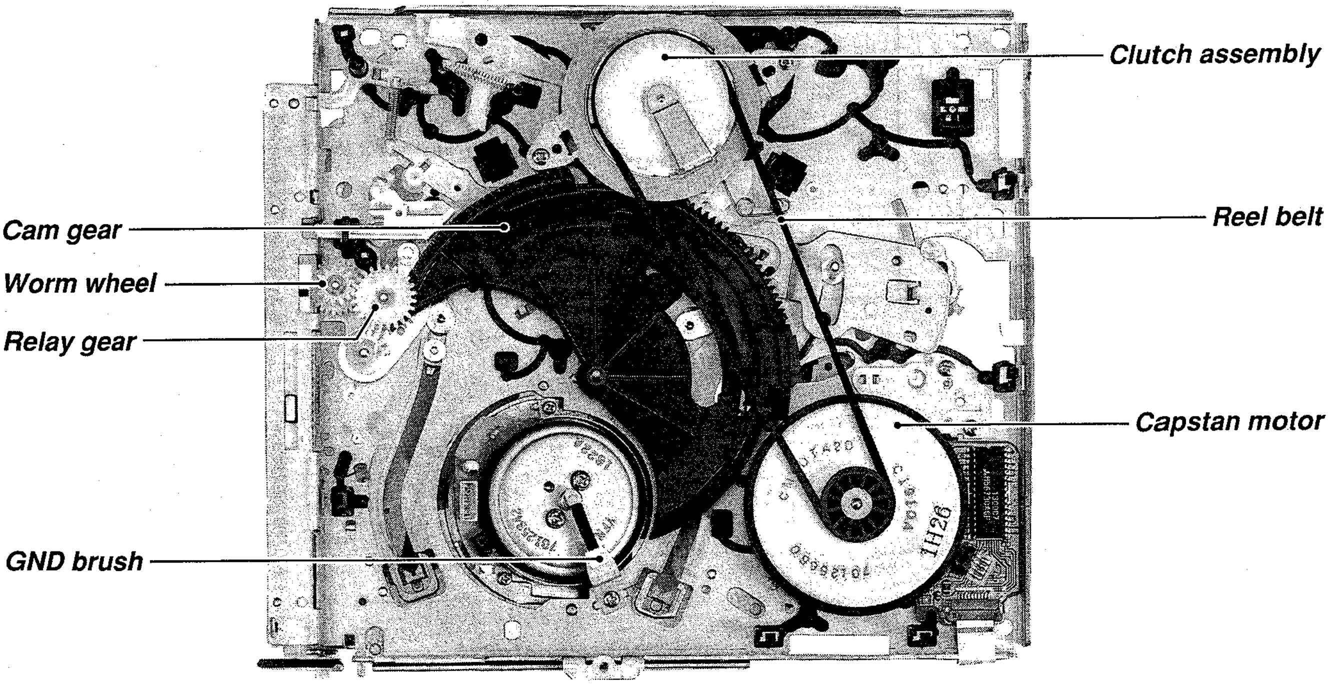
1. MECHANICAL ADJUSTMENT

1-1. Mechanical Parts Location

1-1-1. Mechanism Deck Parts Location

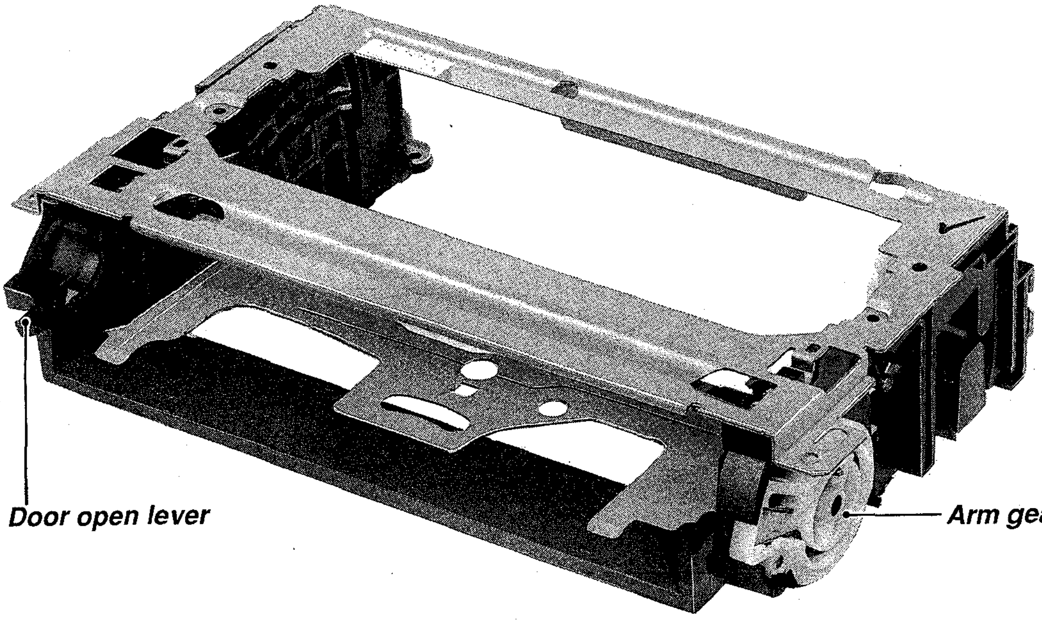

Upper cylinder
Loading motor
S slant guide post
FE (Full width erase) head
No.1 guide
No.0 guide
S (Supply) guide roller
Drive shaft assembly
Tension pole
S (Supply) reel table
Head cleaner
Lower cylinder
Pinch roller
ACE head
No.8 guide post
Capstan
T (Take-up) guide roller
No.10 guide
OSC Guide
T slant guide post
Idle gear
T (Take-up) reel table
IDLE GEAR assembly

Top View

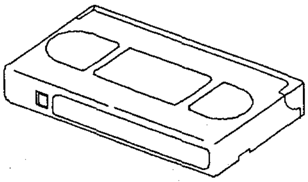
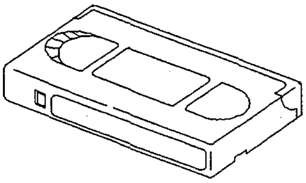
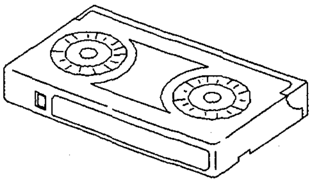
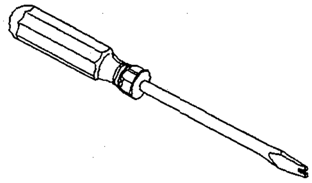
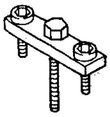

Clutch assembly
Reel belt
Cam gear
Worm wheel
Relay gear
Capstan motor
GND brush

Bottom View

1-1-2. Front Loading Mechanism



1-2. Servicing Jig List

Alignment tape  ST-C3: 70909264 ST-C4: 70909302	**Back tension cassette gauge**  70909103	**Torque cassette gauge (KT-300NR)**  70909199
Taper nut driver  70909228	**Cylinder stripper**  70909198	

Note:
With reference to adjustment for audio system, ST-C1 (70909227) can be used instead of ST-C4.

1-3. Main Parts Servicing Time

- Part replacement time differs from servicing life time of each part.
- Following table is prepared based on a standard condition (room temperature, room humidity). The replacement time will be varied depending upon operation environment, using methods, operation duty, etc.
- Particularly, life of the upper cylinder depends upon operation conditions.

	Part Name	Servicing Time (Operating Hours)										Note
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Tape Transport System	Tension pole	△	△	△	△	△	△	△	△	△	△	• When cleaning, use a swab or a piece of gauze soaked in alcohol. • After cleaning, cleaned parts are dried completely, and then load a video cassette. • When lubricating, always use the specified oil. • When lubricating, apply one or two drops of oil after the cleaning with alcohol.
	S/T-slant guide post											
	Impedance roller*											
	No. 8 guide post											
	Capstan											
	OSC guide post											
	No.0 guide post											
	No.10 guide post											
	S/T-guide roller	△	△	△	○	○	○	○	○	○	○	
	Upper cylinder	△	○	○	○	○	○	○	○	○	○	
	FE head	△	△	△	○	○	○	○	○	○	○	
	ACE head	△	○	○	○	○	○	○	○	○	○	
	Pinch roller	△	○	○	○	○	○	○	○	○	○	• Check the back tension.
Tape Drive System	Capstan motor	△	△	△	△	△	○	○	○	○	○	
	Reel clutch		○	○	○	○	○	○	○	○	○	
	Loading motor				○	○	○	○	○	○	○	
	Loading belt & Reel belt	△	○	○	○	○	○	○	○	○	○	
	Supply reel table				▲				▲		○	
	Take up reel table				▲				▲		○	
	Idle gear assembly	△	○	○	○	○	○	○	○	○	○	
Others	Band brake assembly		○	○	○	○	○	○	○	○	○	

△: Cleaning ▲: Lubrication ○: Check and replace if necessary

* There are two types. One type has an impedance roller and another type has no impedanece roller.

1-4. Main Parts Replacement

1-4-1. Front Loading Assembly Replacement

(1) Front loading assembly replacement

1. Make sure that there is no cassette in the VTR.
2. Remove the top cover and the front panel.
3. Remove two screws (1).
4. Move the front loading assembly in the direction shown by the arrow (A) and remove it from the mechanism deck.
5. When remounting, use the above steps in reverse order.

Note:

- Before reinstalling the front loading assembly, check by pressing the worm gear in the direction of the arrow (B) that the worm gear does not engage the worm wheel (C).
- Check that the F/L worm wheel engages without biting the tip of the worm gear. When the F/L worm wheel is moved, applying F/L assembly to the mechanism deck slightly, confirm that the worm gear moves.

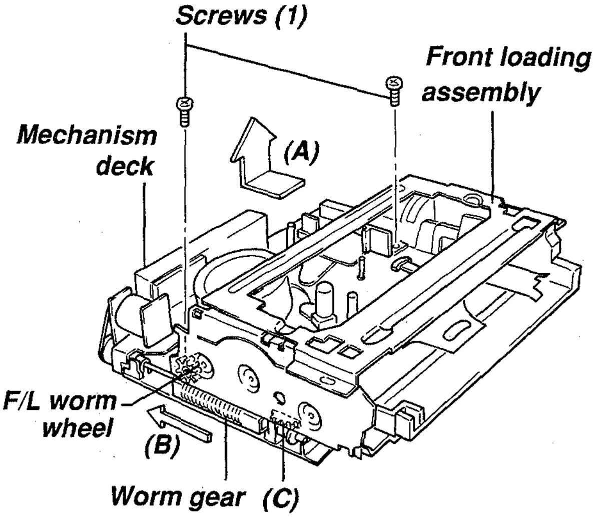

Screws (1)
Front loading assembly
Mechanism deck
(A)
F/L worm wheel
(B)
Worm gear
(C)

Fig. 4-1-1 Front loading assembly replacement

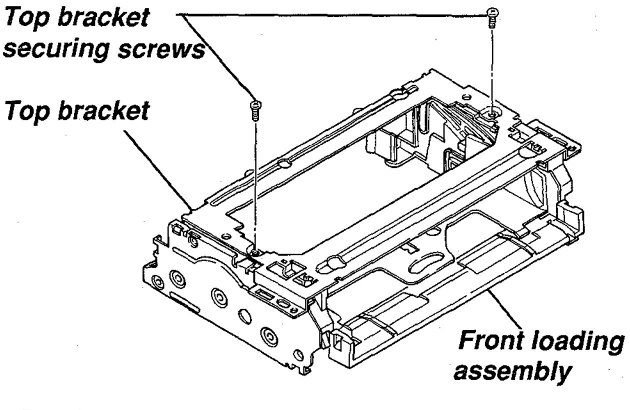

Top bracket securing screws
Top bracket
Front loading assembly

Fig. 4-1-2 Top bracket securing screw replacement

(2) Top bracket securing screw replacement

1. Remove the top bracket securing screw from the front loading assembly.
2. Remount a new top bracket securing screw on the front loading assembly.

(3) Arm gear R replacement

1. Move three claws (1) in the direction of the arrow and remove the arm gear R. (Refer to Fig.4-1-4.)
2. Remove the spring R attaching to the arm gear R.
3. Replace the arm gear in the reverse order of removal.

Note:

- Align the cutout on the drive gear R and the ◄ mark on the arm gear R.
- Pay attention to positions of the boss (A) and the spring R. (Refer to Fig. 4-1-4.)
- When attaching the spring R, confirm that it is in a right position.
- Confirm that Boss (E) of the Fig 4-1-15 View (C) goes into Groove (B).

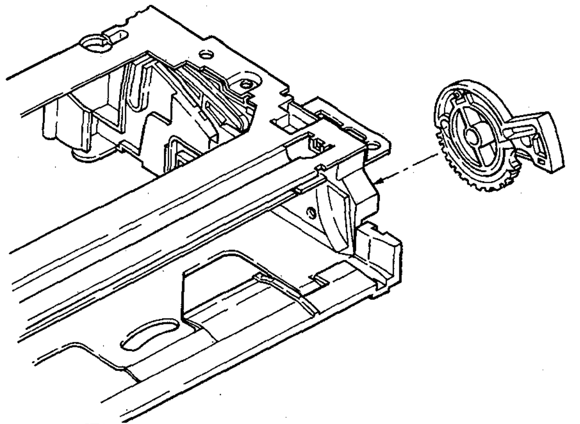


Fig. 4-1-3 Arm gear R replacement

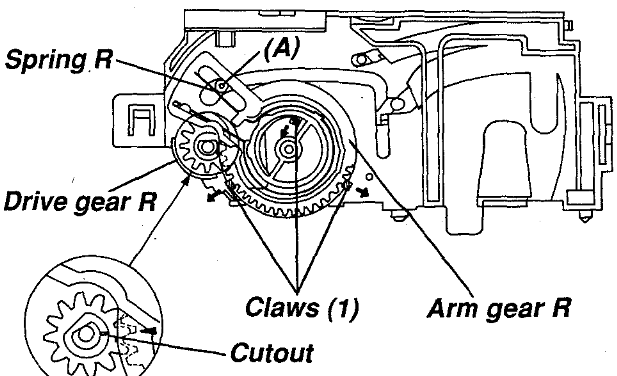

Spring R
(A)
Drive gear R
Claws (1)
Arm gear R
Cutout

Fig. 4-1-4

(4) Door lever replacement

1. To remove the top bracket, remove the top bracket securing screws, push the claws (E) and (F), remove the top bracket upward and slide it in the direction of the arrow (H).
2. Push the claws of the side bracket L, (A), (B), (C) and (D), and remove (A)', (B)', (C)' and (D)' of the back-up plate side.
3. Replace the door lever according to the removing procedures in the reverse order.

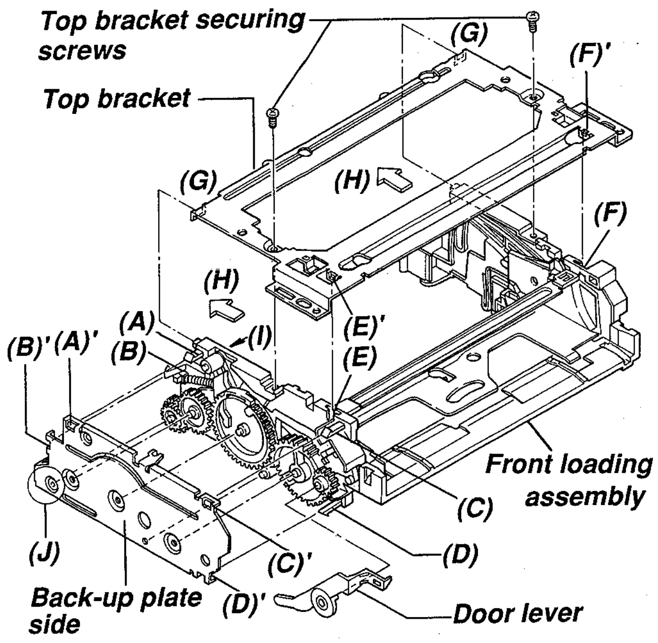

Top bracket securing screws
(G)
(F)'
Top bracket
(G)
(H)
(F)
(H)
(A)
(B)'(A)'
(B)
(I)
(E)'
(E)
Front loading assembly
(C)
(J)
(C)'
(D)
Back-up plate side
(D)'
Door lever

Fig. 4-1-5 Door lever replacement

Note:

- Take care that the end of the door lever (M) is put in the (P) between the walls, (L) and (K), of the arm gear L. (Refer to Fig. 4-1-6.)
- Take care that the end of the door lever (N) is positioned over the holder guide. (Refer to Fig. 4-1-6.)
- When mounting the back-up plate side, take care that its (J) section is positioned over the front loading assembly. (Refer to Fig. 4-1-7.)

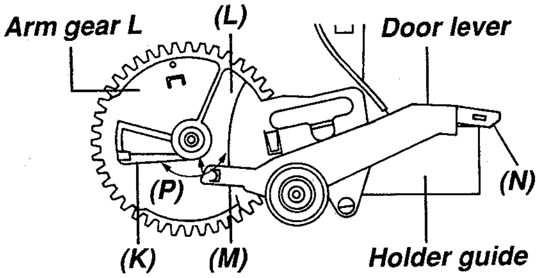

Arm gear L
(L)
Door lever
(P)
(N)
(K)
(M)
Holder guide

Fig. 4-1-6

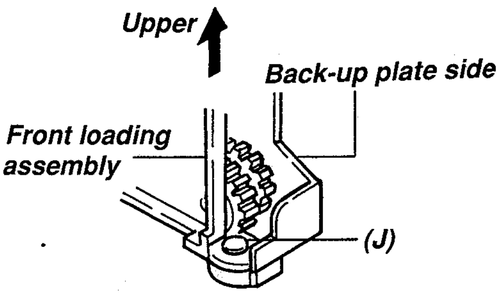

Upper
Back-up plate side
Front loading assembly
(J)

Fig. 4-1-7

(5) Arm gear L replacement

1. Remove the top bracket, back-up plate side and the door lever according to the door lever replacement procedure. (Refer to item "(4) Door Lever Replacement".)
2. Turn the arm gear L in the direction of the arrow (A) (to move the (D) section from the drive gear L) and remove it in the direction of the arrow (B).
3. Apply grease to the tip of the post (2) at the bracket side L (hatching portion).
4. Replace the arm gear L in the reverse order of removal.

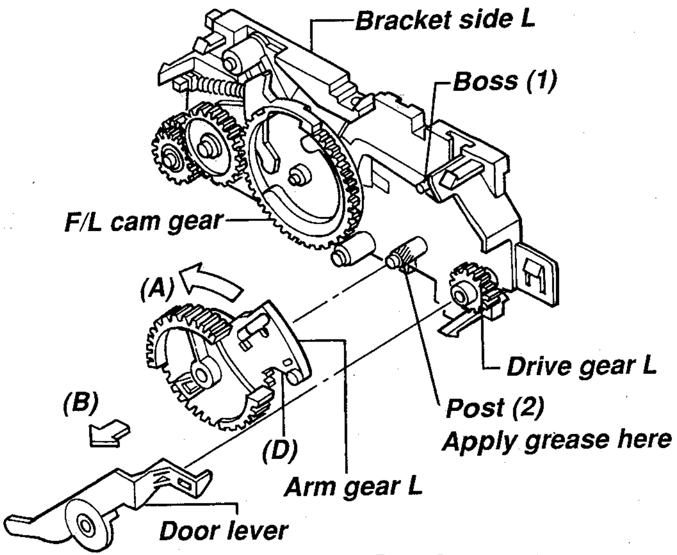

Bracket side L
Boss (1)
F/L cam gear
(A)
Drive gear L
(B)
Post (2)
Apply grease here
(D)
Arm gear L
Door lever

Fig. 4-1-8 Arm gear L replacement

Note:

- Align the (C) part of the drive gear L and the ▼ mark of the arm gear L shown by (C)'.
- Align the ▼ mark of the F/L cam gear and the tip of the upper gear of the arm gear L shown by (E).
- Make sure that the boss (1) and the spring are positioned as shown in Fig. 4-1-9.

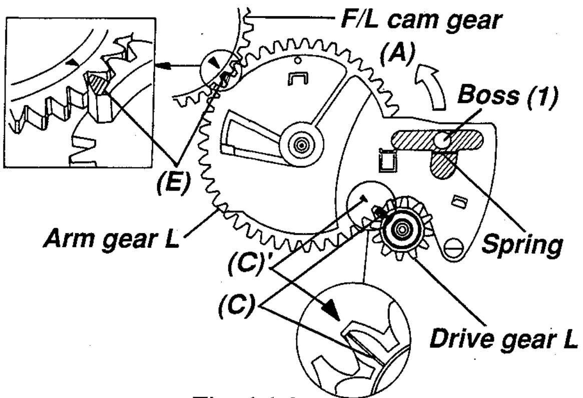

F/L cam gear
(A)
Boss (1)
(E)
Arm gear L
(C)'
(C)
Spring
Drive gear L

Fig. 4-1-9

(6) Relay gear replacement

1. Remove the top bracket and the back-up plate side . (Refer to item " (4) 1., 2. Door Lever Replacement".)
2. Remove the relay gear in the direction of the arrow and apply grease to the tip of the relay gear post.
3. Reinstall a new relay gear in the reverse order of removal.

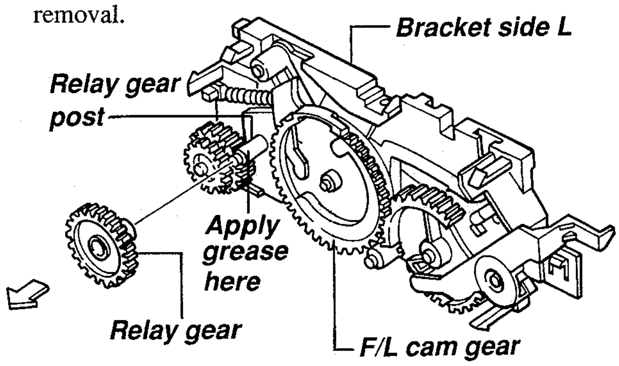

Bracket side L
Relay gear post
Apply grease here
Relay gear
F/L cam gear

Fig. 4-1-10 Relay gear replacement

(7) F/L cam gear replacement

1. Remove the top bracket and the back-up plate side. (Refer to item "(4) 1., 2. Door Lever Replacement".)
2. Remove the relay gear and then remove the F/L cam gear.
3. Apply grease to the relay gear post at the bracket side L and the tip of the F/L cam gear post.
4. Replace the F/L cam gear and apply grease to the outer surface of the gear of the F/L cam gear.
5. Reinstall the cam gear by reversing above procedures.

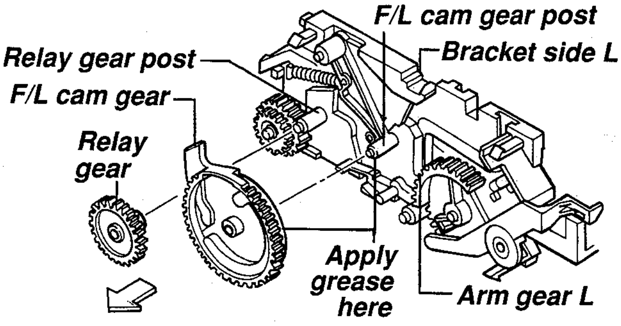

F/L cam gear post
Relay gear post
Bracket side L
F/L cam gear
Relay gear
Apply grease here
Arm gear L

Fig. 4-1-11 Cam gear replacement

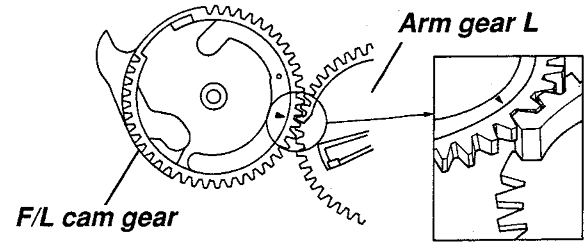

Arm gear L
F/L cam gear

Fig. 4-1-12 Phase matching

Note:

Align the ▼ mark on the F/L cam gear and the tip of the gear tooth (thicker) of the arm gear L.

(8) F/L worm wheel replacement

1. Remove the top bracket and the back-up plate side. (Refer to item "(4) 1., 2. Door Lever Replacement".)
2. Remove the relay gear and then remove the F/L worm wheel.
3. Apply grease to the tip of the worm wheel post.
4. Reinstall a new F/L worm wheel using the previous steps in reverse order.

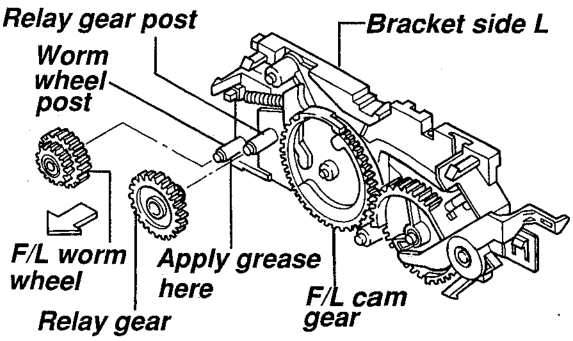

Relay gear post
Bracket side L
Worm wheel post
F/L worm wheel
Apply grease here
F/L cam gear
Relay gear

Fig. 4-1-13 F/L worm wheel replacement

(9) Door lock lever replacement

1. Make the cassette holder assembly slid to an about 30 mm inner side.
2. Push two claws (A)' of the front loading assembly in the direction of the arrow and remove the holder guide upward.
3. Remove the arm gear R. (Refer to item "(3) Arm Gear R Replacement".)
4. Remove the door lock spring from the hook of the front loading assembly. (Refer to Fig. 4-1-15.)
5. Remove the door lock lever from the drive shaft (F/L) and remove the door lock spring from the door lock lever.
6. Mount a new door lock lever in the reverse order of removal.

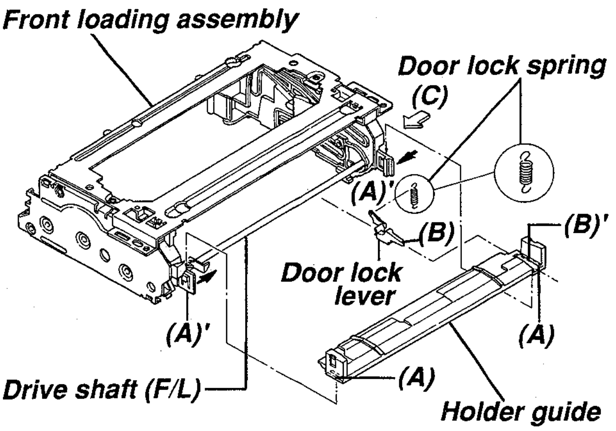

Front loading assembly
Door lock spring
(C)
(A)'
(B)
(B)'
Door lock lever
(A)'
(A)
Drive shaft (F/L)
(A)
Holder guide

Fig. 4-1-14 Door lock lever replacement

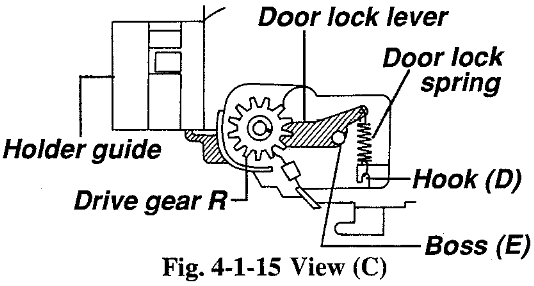

Door lock lever
Door lock spring
Holder guide
Drive gear R
Hook (D)
Boss (E)

Fig. 4-1-15 View (C)

Note:

- Take care not to give permanent deformation to the door lock spring.
- In installing the holder guide, insert the tip of the door lock lever (B) into the hole (B)' on the holder guide.
- Confirm that Boss (E) goes into Groove (B) of Fig 4-1-3.

(10) Door lock spring replacement

1. Remove the holder guide and the door lock lever. (Refer to item "(9) Door Lock Lever Replacement").
2. Remove the door lock spring from the door lock lever.
3. Mount a new door lock spring in the reverse order of removal.

(11) Drive shaft (F/L) assembly replacement

1. Remove the arm gear R according to the replacement procedure for the arm gear R. (Refer to item "(3) Arm Gear R replacement".)
2. Remove the holder guide and the door lock lever. (Refer to item "(9) Door Lock Lever Replacement".)
3. Remove the top bracket. (Refer to item "(4) Door Lever Replacement 1.").

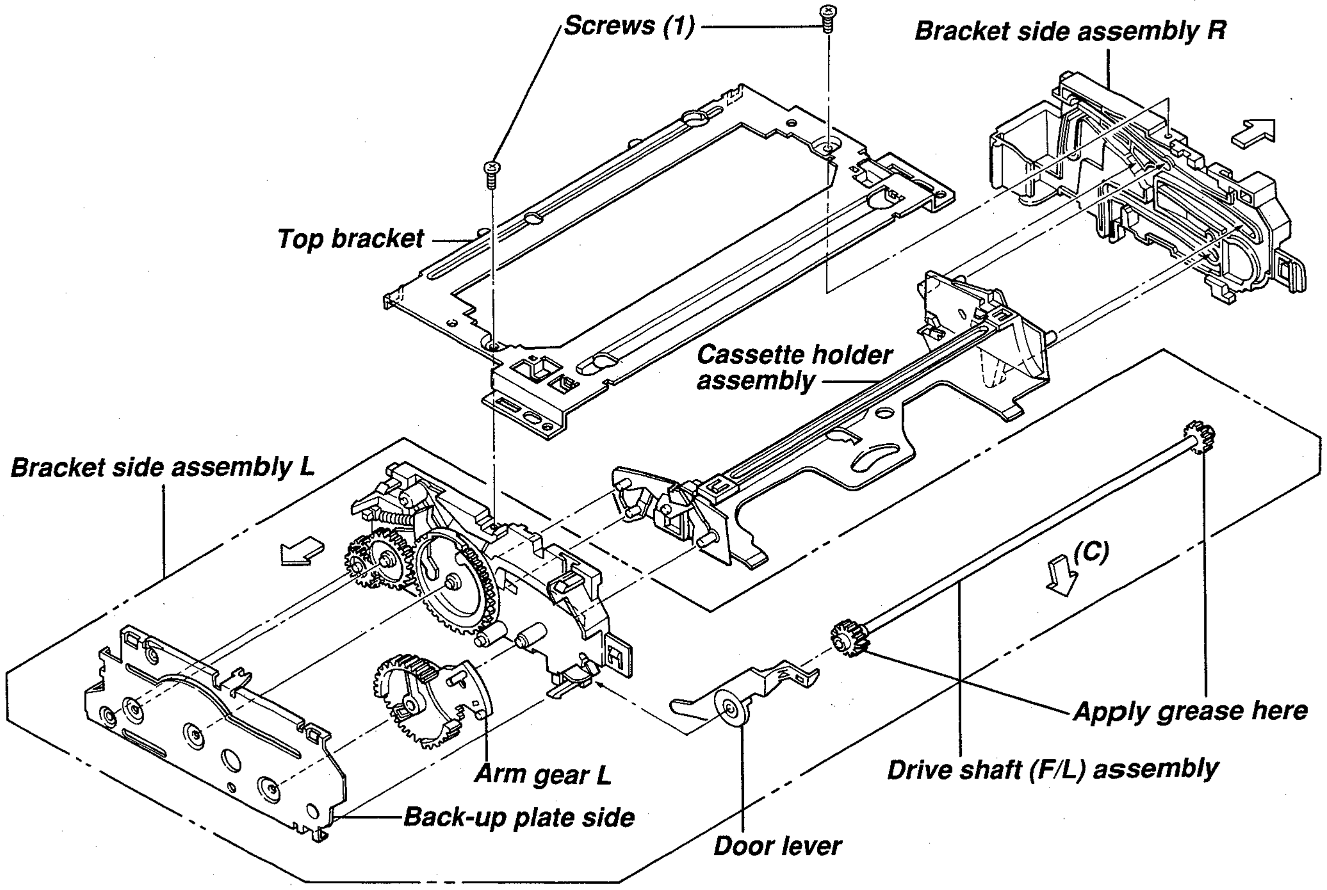

Screws (1)
Bracket side assembly R
Top bracket
Cassette holder assembly
Bracket side assembly L
(C)
Apply grease here
Drive shaft (F/L) assembly
Arm gear L
Back-up plate side
Door lever

Fig. 4-1-16 Drive shaft (F/L) assembly replacement

4. Remove the bracket side assembly R and the bracket side assembly L from the cassette holder assembly.
5. Remove the back-up plate side from the bracket side assembly L. (Refer to item "(4) Door Lever Replacement 2.").
6. Remove the door lever and then arm gear L from the bracket side assembly L. (Refer to item "(4) Door Lever Replacement" and "(5) Arm Gear L Replacement".)
7. Remove the drive shaft (F/L) assembly from the bracket side assembly L in the direction of the arrow (C) (This can be removed by bending the wall (D) in the (A) direction). (Refer to Fig. 4-1-17.)
8. After replacing the drive shaft (F/L) assembly, apply grease to the outer surface of the gear.
9. Install the drive shaft (F/L) assembly according to the reverse procedure.
10. Make sure that it is operating normally.

Note:

- When mounting the bracket side assembly L on the cassette holder assembly, let bosses (E), (F) and (G) of the cassette holder through the grooves on the bracket side assembly L, (E)', (F)' and (G)', respectively. Also pass the boss (E) between the groove (E)" on the arm gear L and spring (2) (upper side). (Refer to Fig. 4-1-18.)
- When mounting the bracket side assembly R on the cassette holder, pass bosses (H), (I), (J) and (K) through the grooves on the bracket side assembly R, (H)', (I)', (J)' and (K)', respectively. (Refer to Fig. 4-1-19.)

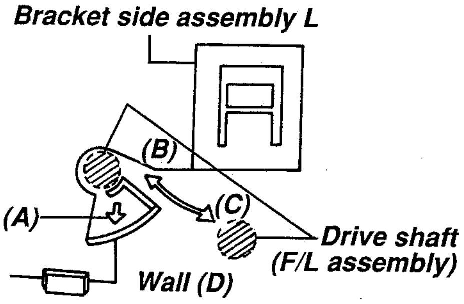

Bracket side assembly L
(B)
(A)
(C)
Drive shaft
(F/L assembly)
Wall (D)

Fig. 4-1-17

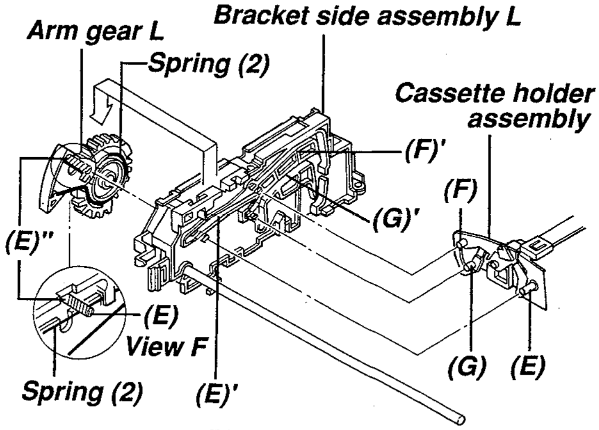

Arm gear L
Bracket side assembly L
Spring (2)
Cassette holder assembly
(F)'
(F)
(G)'
(E)"
(E)
View F
(G)
(E)
Spring (2)
(E)'

Fig. 4-1-18

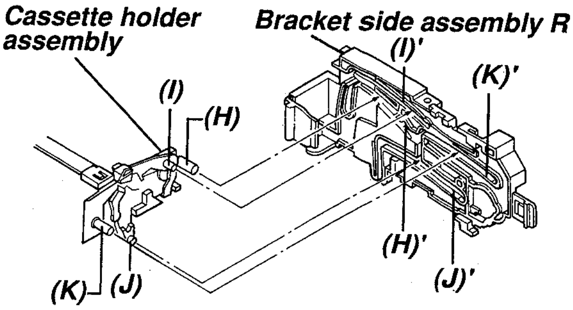

Cassette holder assembly
Bracket side assembly R
(I)'
(K)'
(I)
(H)
(H)'
(K)
(J)
(J)'

Fig. 4-1-19

1-4-2. Cylinder Replacement

(1) Upper cylinder assembly

<Inspection>

1. Check if the video heads are damaged or worn out.
2. Check the video heads for clogging. (Replace the upper cylinder assembly if the clogging is not remedied after cleaning).

Note:
The cylinder is a very sensitive part.
Wear clean cotton gloves.

<Replacement>

1. Remove the two screws fixing the upper cylinder to the flywheel.
2. Screw the two thin rods of cylinder stripper into the relevant holes of the upper cylinder.
3. Turn the press rod clockwise, till it sits on the surface of the spindle.
4. Continue turning the press rod till the upper cylinder is completely free.
5. The tacho wheel has three thick bars and several thin bars. To align the new cylinder, watch the three thick bars through the cylinder base window.
6. Turn the spindle till the middle black bar can be seen in the center of the cylinder base window.
7. Using a hairdryer, worm the cylinder up to 40°C.
   Note:
   Care should be taken not to heat the cylinder over 50°C, otherwise the cylinder could be damaged.
8. Place the new upper cylinder with the green video head exactly above the black bar.
9. Tighten the two securing screws alternately in order to keep the upper cylinder perpendicular to the spindle. Torque value should be kg-cm ± 0.5kg-cm.

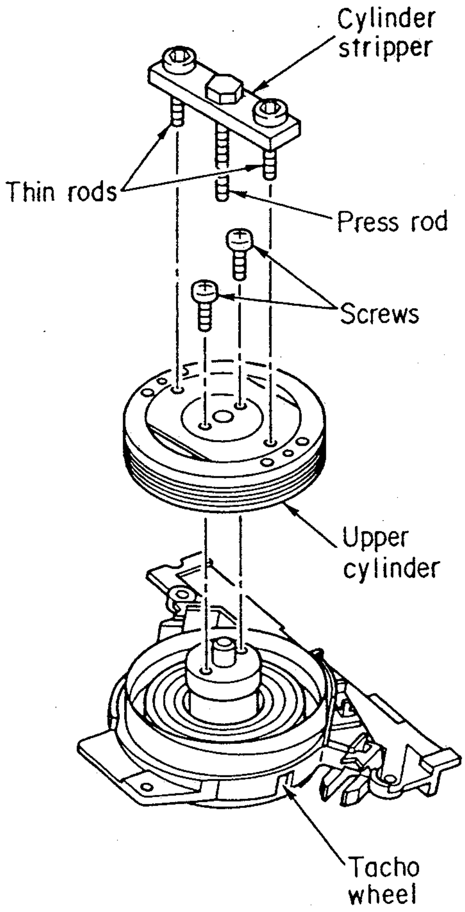


Fig. 4-2-1

(2) Cylinder assembly

<Inspection>

1. Check if rotating surface of the lower cylinder has no damages such as scratches, cracks, etc.
2. Check to see smooth rotation of the upper cylinder. If abnormality is found, replace the cylinder assembly.

<Replacement>

1. Remove the preamplifier (1) by removing two securing screws (8).
2. Disconnect the connector (2).
3. Remove three cylinder securing screws (4).
4. Remove the cylinder assembly (5).
5. Position the cylinder base (7) first. Mount a new cylinder assembly using the previous steps in reverse order, taking care not to touch the video heads directly and not to damage the cylinder surface.
6. Perform the tape transport adjustment.

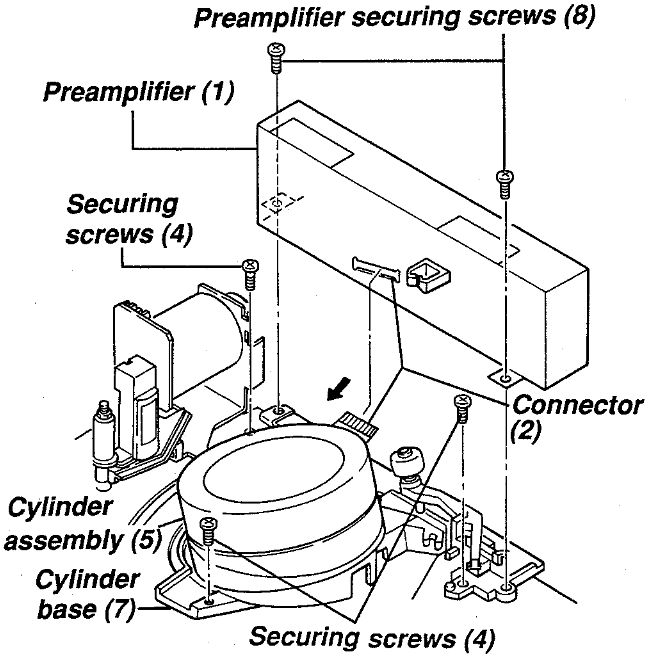

Preamplifier securing screws (8)
Preamplifier (1)
Securing screws (4)
Connector (2)
Cylinder assembly (5)
Cylinder base (7)
Securing screws (4)

Fig. 4-2-2 Cylinder assembly replacement

(3) Head cleaner assembly replacement

1. Remove the spring (1) from the hook at the ACE base (A).
2. Remove the stop ring (2) and remove the head cleaner assembly (3).
3. Replace the head cleaner assembly in the reverse order of removal.

Note:

- Take care that the head cleaner roller (B) is not contaminated by grease, oil, dust, etc.
- After remounting, check to see the head cleaner assembly is smoothly rotating and the stopper (C) is attached to the cylinder base (D).

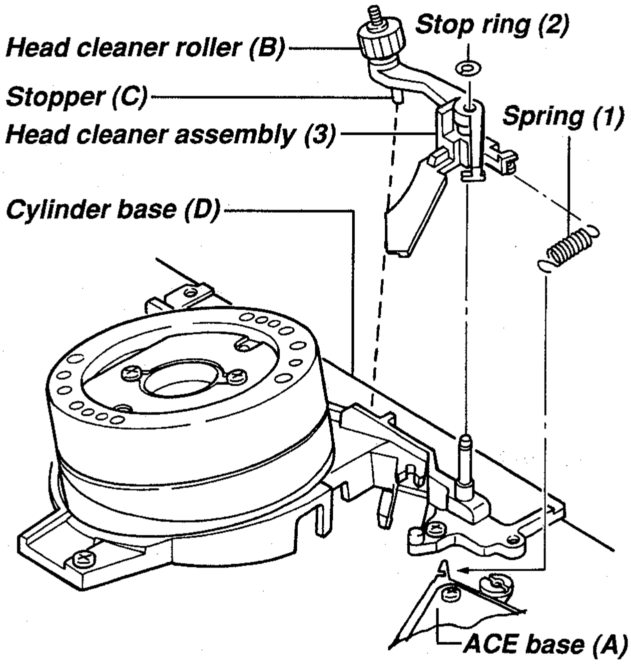

Head cleaner roller (B)
Stop ring (2)
Stopper (C)
Head cleaner assembly (3)
Spring (1)
Cylinder base (D)
ACE base (A)

Fig. 4-2-3 Head cleaner assembly replacement

1-4-3. Transport System Parts Replacement

(1) ACE head assembly replacement

1. Disconnect the FPC (8) from the connector.
2. Remove the head cleaner spring (13) from ACE main base (1).
3. Remove the taper nut (3).
4. Turn the ACE height adjusting nut (7) counterclockwise and remove it upward in order to remove the ACE base assembly (5).

Note:

Note positions of ACE main base (1) and the upper surface of taper nut (3).

5. Remove the E-ring (9) and the azimuth adjusting screw (2) in order to remove the ACE head assembly (11).
6. Replace the ACE head assembly (11), according to the reverse procedures.
7. Mount the taper nut (3) and the spring (13) in the reverse order of removal and insert the FPC (8) into the connector.

Note:

When mounting ACE torsion spring (4), first insert the tip of the spring into the hole on the main base and then hook the opposite tip of the spring to ACE main base (1) which has been inserted into ACE post (12).
Mount the taper nut (3) while moving the base (1) counterclockwise with your hand.

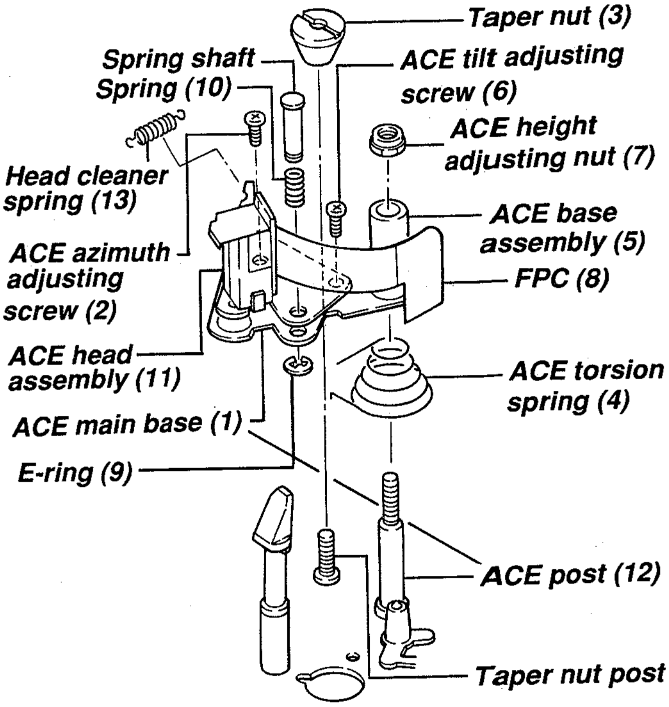

Taper nut (3)
Spring shaft
Spring (10)
ACE tilt adjusting screw (6)
ACE height adjusting nut (7)
Head cleaner spring (13)
ACE base assembly (5)
ACE azimuth adjusting screw (2)
FPC (8)
ACE head assembly (11)
ACE torsion spring (4)
ACE main base (1)
E-ring (9)
ACE post (12)
Taper nut post

Fig. 4-3-1

8. Rotate the ACE height adjusting nut (7) until the ACE base and the upper position of the taper nut have the same position as they were removed.
9. After mounting, perform the tape transport adjustment, starting from the first step.

Note:

Take care not to install an ACE head assembly of different type.

(2) No. 8 guide sleeve replacement

1. Remove No. 8 cap (1) and No. 8 guide sleeve in this sequence as shown in Fig. 4-3-2. When reassembling, perform the previous steps in reverse order.
2. To mount No. 8 guide sleeve (2), insert No. 8 cap (1) onto No. 8 post (3) and push the cap downward while turning it left and right.

Note:

- No. 8 guide sleeve functions as reference for tape transport, so the replacement should be made carefully not to damage the main base flatness.
- When mounting the No. 8 guide cap, mount the cap with its slant surface facing to cassette side.
- The guide sleeve has a directional characteristic, so take care when inserting it. Do not insert it upsidedown. The lower flange thickness is higher than the upper thickness by about 1.6mm.

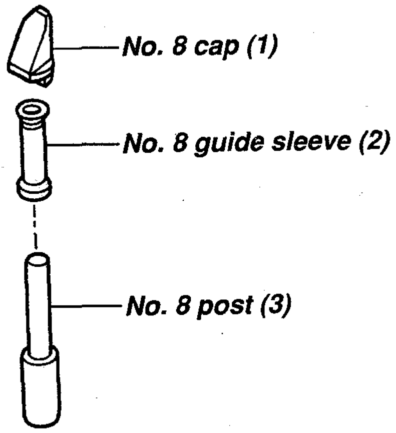


Fig. 4-3-2

(3) FE head replacement

1. Disconnect the 2P connector of the FE head.
2. Remove the FE head mounting screw (5) shown in Fig. 4-3-3 and the FE head (6) can be removed.
3. Remount a new FE head and tighten the FE head mounting screw (5).
4. Connect the 2P connector.
5. Perform the transport adjustments, starting check from the linearity adjustment.

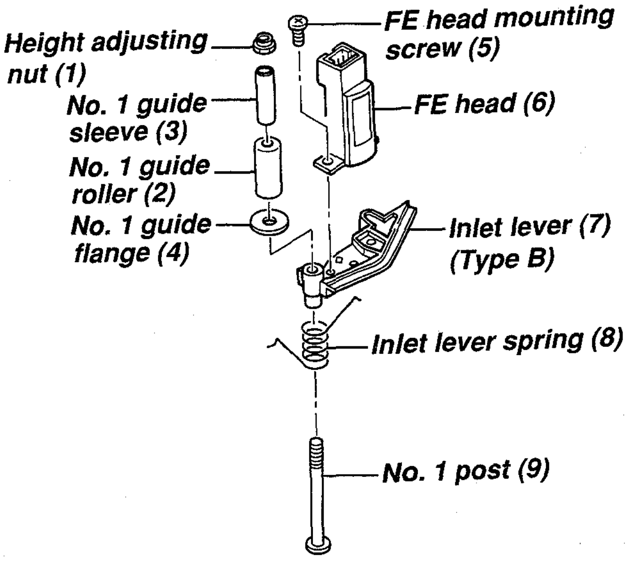


Fig. 4-3-3

(4) No. 1 guide roller replacement

1. Remove the nut (1) shown in Fig. 4-3-3 and then remove the No. 1 guide roller (2).
   When removing the nut (1), note that inlet lever (7) detaches from stopper and the lever does not hit cylinder.
   (Before removing, note the number of threads exceeding the surface of the nut of the inlet lever.)
2. Mount the No. 1 guide roller according to the reverse procedures.
   (Tighten the nut until the same thread number appears so that the roller will be of the same height as before.)
3. After replacing the No. 1 guide roller, perform the tape transport adjustment, starting from the linearity adjustment.

Note:

Confirm that Inlet lever is in the position which is shown in Fig.4-4-2.

(5) Impedance roller replacement

(Depending on the model, the impedance roller is included.)

1. Remove the impedance roller cap (10), shown in Fig. 4-3-4.
2. Remove the stop ring (11).
3. Mount a new impedance roller assembly in the reverse order of removal.
4. After replacement of the impedance roller, perform the tape transport adjustment from the linearity adjustment.

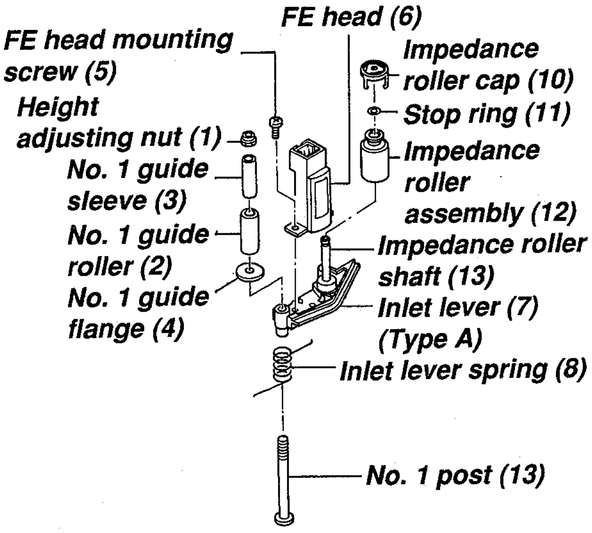

FE head (6)
FE head mounting screw (5)
Height adjusting nut (1)
Impedance roller cap (10)
Stop ring (11)
No. 1 guide sleeve (3)
Impedance roller assembly (12)
No. 1 guide roller (2)
Impedance roller shaft (13)
No. 1 guide flange (4)
Inlet lever (7) (Type A)
Inlet lever spring (8)
No. 1 post (13)

Fig. 4-3-4

(6) S, T-guide rollers replacement

The same replacement procedures will be applied for both S and T-guide rollers.

1. Loosen the set screw (2), shown in the Fig. 4-3-5.
2. Turn the guide roller (1) counterclockwise and remove it.
3. Replace the guide roller by reversing the procedures.
4. After replacing the guide roller, perform the tape transport adjustment from the linearity adjustment.

Note:

- Take care since this guide roller has no O-ring.
- Tighten the set screw (2) with light pressure to allow the guide roller height to be adjusted.
- The T-guide roller has a mark on the upper flange, while the S-guide roller has no mark. Do not exchange them when remounting.

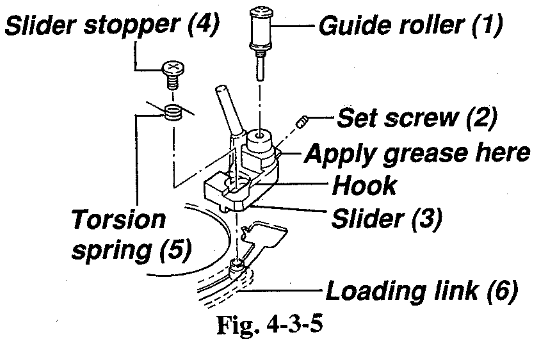

Slider stopper (4)
Guide roller (1)
Set screw (2)
Apply grease here
Hook
Torsion spring (5)
Slider (3)
Loading link (6)

Fig. 4-3-5

(7) S, T-sliders replacement

1. Remove the cylinder assembly.
2. Move the slider up manually to the loading position.
3. Remove the slider stopper (4) and the torsion spring (5), shown in Fig. 4-3-5.
4. Remove the guide roller and reinstall it in a new slider according to the procedures for replacement of S, T-guide rollers.
5. Replacement is made by reversing above procedures. When mounting the torsion spring and the slider stopper, hold the rear side of the loading link (6), shown in Fig. 4-3-5 from the cylinder mounting hole.
6. After completion of the replacement, perform the rough adjustment in the tape transport adjustment.

Note:

- Place the torsion spring in such a way that the shorter arm will come at the bottom. When mounting the slider stopper, confirm the torsion spring is not positioned over the hook at the slider.
- When the slider is replaced, always apply grease to the slider receptacle as shown in Fig. 4-3-5.

(8) S, T-loading torsion springs replacement

The same replacement procedures will be applied for both S and T-loading torsion springs.

1. Remove the front loading assembly.
2. Place the deck vertically and remove the bottom plate and the mechanism P.C. board.
3. Remove the slider stopper (4) and the S, T-loading torsion springs (5) shown in Fig. 4-3-5 with the slider set to the unloading state.
4. When replacing, use above steps in reverse order. Remount the S, T-loading torsion springs while holding the rear side of the loading link (6), shown in the Fig. 4-3-5.
5. After completion of the replacement, perform the transport adjustment from the linearity adjustment.

Note:

- The form of the torsion spring differs according to the slider type, S or T. Confirm that you take the right one in mounting.
- The torsion spring is placed in such a way that the shorter arm will come at the bottom. When mounting the slider stopper, check to see that the torsion spring is not positioned over the hook at the slider.

(9) OSC guide lever assembly replacement

1. Remove the front loading assembly.
2. Remove the OSC guide nut (1) by turning it counterclockwise and remove the OSC guide lever assembly together with the spring (3) upward by turning them counterclockwise.

Note:
Note the number of threads exceeding the surface of the nut.

3. Replace the OSC guide lever assembly (2) with a new one.

Note:
After completion of the replacement, place the hook at the upper end of spring (3) on the lever (2) to keep the OSC guide lever assembly with the hook attached.

4. Assemble by reversing above procedures. At that time, tighten the nut (1) so that the position of it is the same as before.

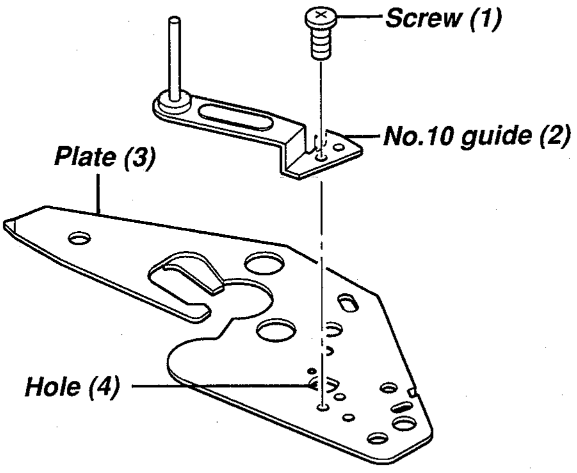
Note:
- Make sure that the OSC drive lever (4) matches the gear of the OSC guide lever assembly (2). (Align each protruded part.)
- Apply grease to the contacting surface between the OSC guide assembly (2) and the nut (1) and around the base of post (5).
- Note that the upper and lower sides of the nut are not mistaken.
- When mounting the OSC guide lever in the main base, note that it does not bend by touching cassette datum post.

5. After completion of the replacement, perform the adjustment according to item "1-5-4. (3) 5) OSC Guide Lever Adjustment".

(10) No.10 guide replacement

1. Remove the front loading assembly.
2. Remove the screw (1) and remove No.10 guide (2).
3. Assemble by reversing above procedures.
4. After completion of the replacement, perform the tape transport adjustment from the OSC guide lever adjustment.

Note:
- When the guide is replaced, put the stopper portion of No.10 guide into the hole (4), and tighten the screw (1).


Screw (1)
No.10 guide (2)
Plate (3)
Hole (4)

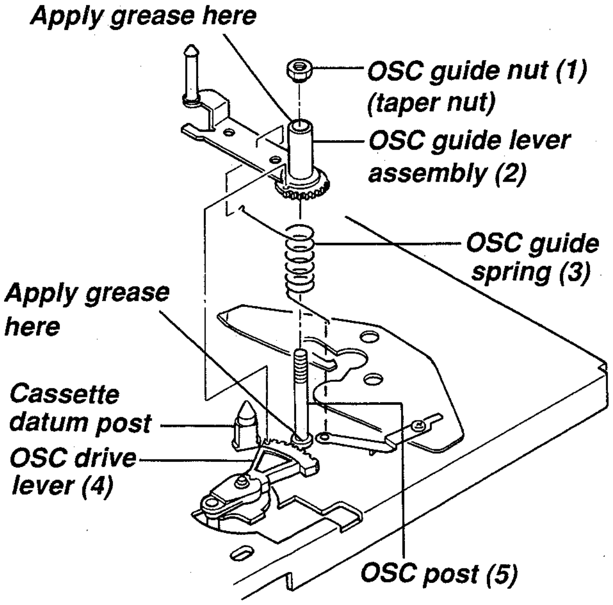

Apply grease here
OSC guide nut (1)
(taper nut)
OSC guide lever
assembly (2)
OSC guide
spring (3)
Apply grease
here
Cassette
datum post
OSC drive
lever (4)
OSC post (5)

Fig. 4-3-6

Put the stopper portion of No.10 guide into the hole (4), and tighten the screw (1)

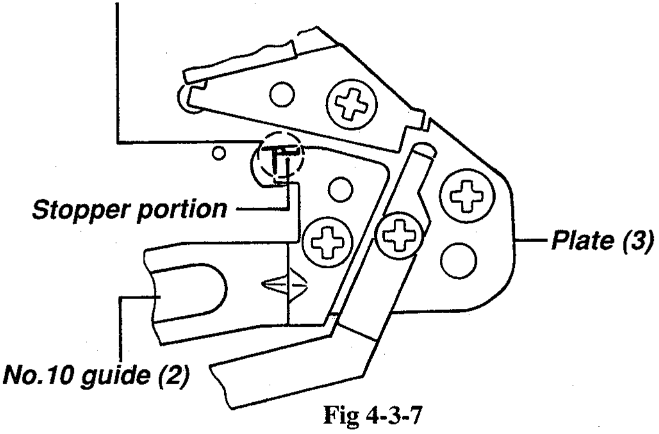

Stopper portion
Plate (3)
No.10 guide (2)

Fig 4-3-7

1-4-4. Loading Motor Assembly Replacement

1. Remove the loading belt.
2. Remove the screw (1) and remove the loading motor assembly from the main base.
   Note that the lever of FE head assembly does not hit the cylinder.
3. Replace the loading motor assembly in the reverse order of removal. When remounting, turn the FE head assembly in the direction shown by the arrow.

Note:

- Take care that the loading belt is not twisted.
- Make sure that the protruded part (D) of the FE head assembly is positioned at the left of the wall (C) of the loading motor assembly.

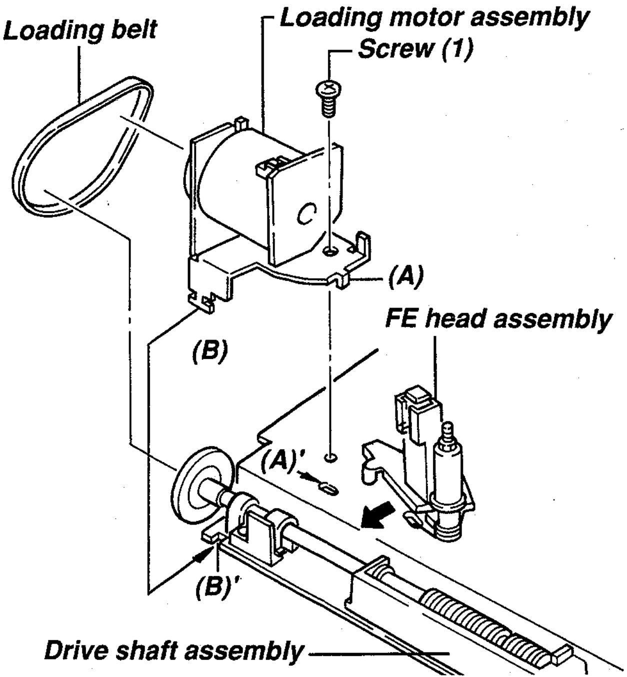

Loading belt
Loading motor assembly
Screw (1)
C
(A)
FE head assembly
(B)
(A)'
(B)'
Drive shaft assembly

Fig. 4-4-1 Loading motor assembly replacement

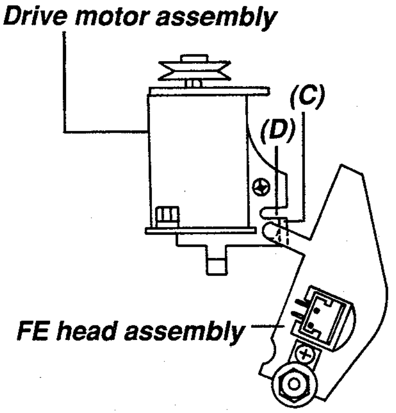

Drive motor assembly
(C)
(D)
FE head assembly

Fig. 4-4-2

1-4-5. Stopper Plate Replacement

1. Remove the stopper plate from the main base by removing the screw (1).
2. Mount the stopper plate on the main base with the screw (1) in such a way that the boss (A) will match the hole (A)'.

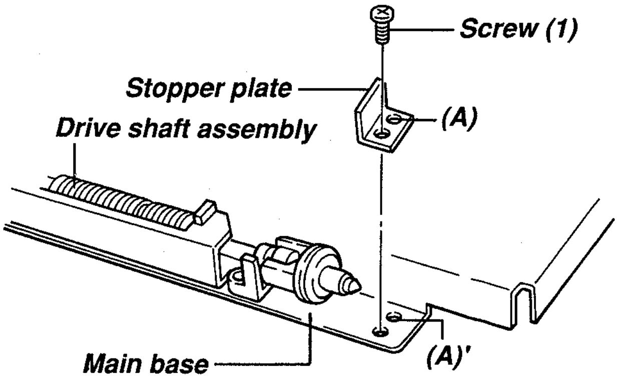

Screw (1)
Stopper plate
Drive shaft assembly
(A)
Main base
(A)'

Fig. 4-5-1 Stopper plate replacement

1-4-6. Drive Shaft Assembly Replacement

1. Remove the main brake charge lever according to the main brake charge lever mounting procedure. (Refer to item "1-4-7 (2)".)
2. Remove the drive belt and loading motor assembly according to the loading motor assembly replacement procedures. (Refer to item "1-4-4. Loading Motor Assembly Replacement".)
3. Remove two screws (2) and remove the drive shaft assembly.
4. Remount the drive shaft by reversing above procedures.

Note:

- Insert the projection (G) of the drive shaft assembly into the hole (G)' on the main base and energize the worm section in the direction of the arrow (F). (The worm section should not engage the gear (H)).
- As shown in Fig. 4-6-2, place the pot MB clutch with its projection (E) facing to the inside of the main base and the groove section facing upward. (At this time, the spring can be watched from the upper side).
- The gear part of the drive shaft assembly should be applied grease.

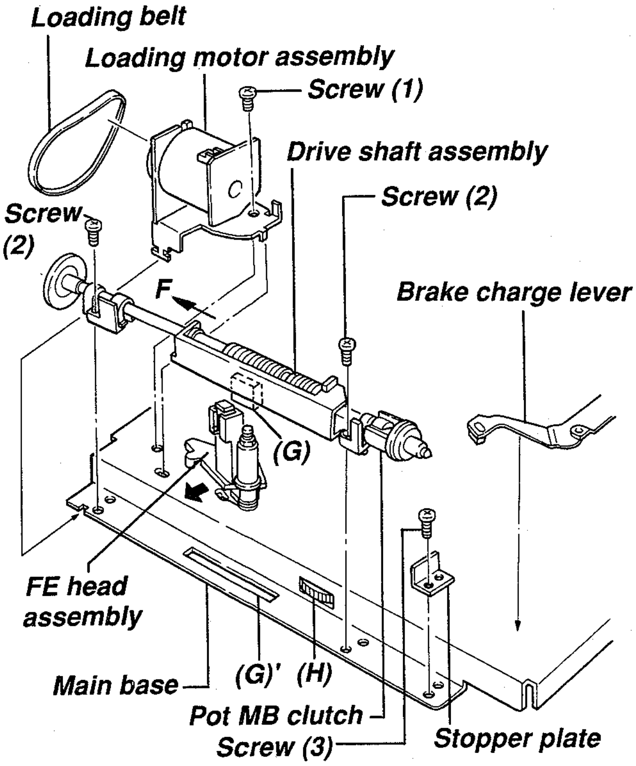

Loading belt
Loading motor assembly
Screw (1)
Drive shaft assembly
Screw (2)
Screw (2)
F
Brake charge lever
(G)
FE head assembly
Main base
(G)'
(H)
Pot MB clutch
Screw (3)
Stopper plate

Fig. 4-6-1 Drive shaft assembly replacement

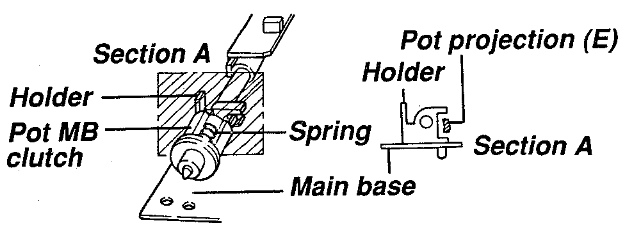

Section A
Holder
Pot MB clutch
Spring
Main base
Pot projection (E)
Holder
Section A

Fig. 4-6-2 Position of pot MB clutch

1-4-7. Main Brake System Parts Replacement

(1) Main brake lever assembly replacement

1. Remove the front loading assembly.
2. Remove the springs from the hooks (1) and (2) of the main base.
3. Remove the main brake lever upward by sliding it in the direction of the arrows (B) and (D) while pushing the chassis in the direction of the arrows (A) and (C).
4. Mount a new main brake lever in the reverse order of removal.

Note:

When replacing the main brake lever, take care not to touch the pad surface of the brake.

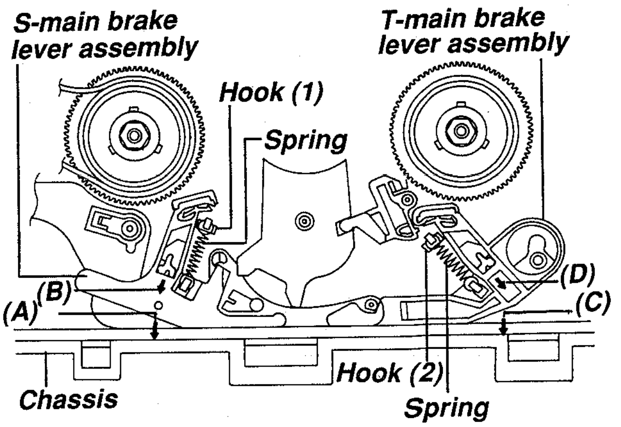

S-main brake lever assembly
T-main brake lever assembly
Hook (1)
Spring
(B)
(A)
(D)
(C)
Chassis
Hook (2)
Spring

Fig. 4-7-1

(2) Main brake charge lever replacement

1. Remove the front loading assembly.
2. Remove the S, T-main brake levers. (Refer to item (1).)
3. Remove the spring from the hook (1) of the main base.
4. When removing the main brake charge lever, turn the idle arm assembly in the direction of the arrow (A) and push the claws (2) and (3) in the direction of the arrows (C) and (D) while lifting the (B) section slightly.
5. Mount new main brake charge levers in the reverse order of removal.

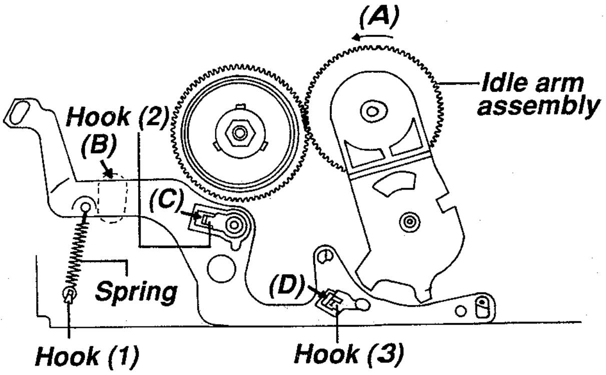

(A)
Idle arm assembly
Hook (2)
(B)
(C)
Spring
(D)
Hook (1)
Hook (3)

Fig. 4-7-2

1-4-8. Idle Arm Kick Lever Replacement

1. Remove the front loading assembly, or move the cassette holder down to the loading position by turning the mode motor without inserting the cassette.
2. Pull the idle arm assembly up by turning it in the direction of the arrow (A) and pushing its claw (1) with tweezers, etc. in the direction of the arrow (B).
3. Install a new idle arm kick lever by reversing above procedures.

Note:

Install the idle arm kick lever so that the (C) section may properly engage the (D) section of the idle arm assembly.

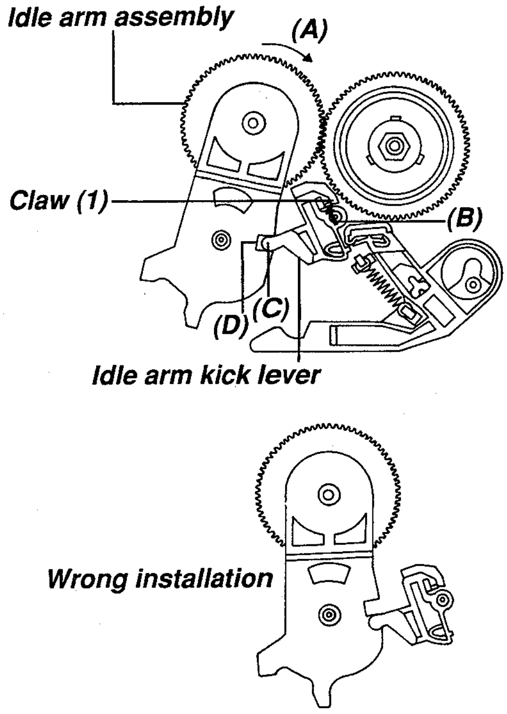

Idle arm assembly
(A)
Claw (1)
(B)
(D)
(C)
Idle arm kick lever
Wrong installation

Fig. 4-8-1

1-4-9. S-Soft Brake Replacement

1. Remove the S-soft brake spring from the hook (3) of the S-slider lock lever and the hook (2) of the S-soft brake.
2. To remove, move the claw (1) of the S-soft brake with tweezers, etc. in the direction shown by the arrow (C), pull the S-soft brake up and turn it in the direction of the arrow (B).
3. Mount a new S-soft brake by reversing the above procedures.

Note:

- When installing the S-soft brake, insert the boss (A)' of the S-soft brake into the cam groove (A) of the cam gear.
- Before the S-soft brake lever is attached, the S-slider lock lever should be turned in the direction of the arrow (D).
- Take care not to stretch the hook of the S-soft brake spring.

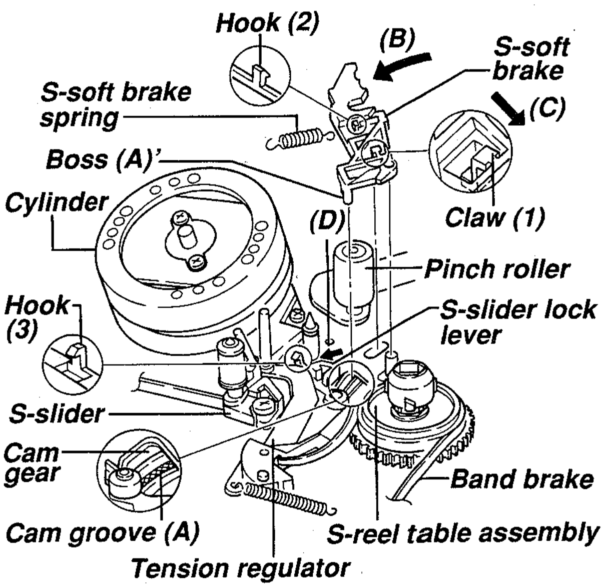

Hook (2)
(B)
S-soft brake
S-soft brake spring
(C)
Boss (A)'
Cylinder
(D)
Claw (1)
Pinch roller
Hook (3)
S-slider lock lever
S-slider
Cam gear
Band brake
Cam groove (A)
S-reel table assembly
Tension regulator

Fig. 4-9-1 S-soft brake replacement

1-4-10. S-Slider Lock Replacement

1. Remove the S-soft brake. (Refer to item "1-4-9. S-soft Brake replacement").
2. Remove the tension regulator assembly. (Refer to item "1-4-26. (1) Tension regulator assembly replacement".)
3. Turn the drive shaft reel in the direction of the arrow(A) and move the S-slider from the S-slider lock in the direction of the arrow (B) (Refer to Fig. 4-10-2 A and B.)
4. Remove the S-slider lock by turning it in the direction of the arrow (C) and moving the claw (1) in the direction of the arrow (D).
5. Mount a new S-slider lock in the reverse order of removal.

Note:

After completion of the replacement, put the S-slider back in its place where it was.

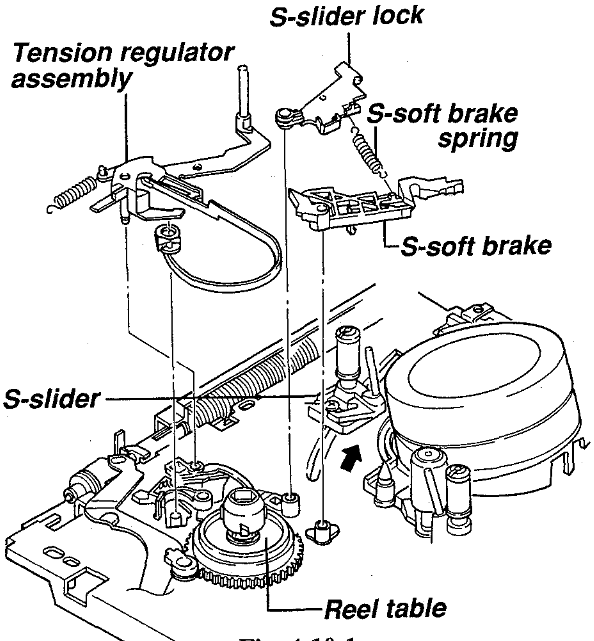

S-slider lock
Tension regulator assembly
S-soft brake spring
S-soft brake
S-slider
Reel table

Fig. 4-10-1

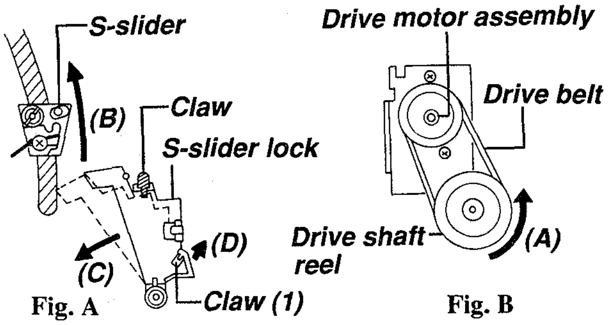

S-slider
(B)
Claw
S-slider lock
(C)
(D)
Claw (1)
Drive motor assembly
Drive belt
Drive shaft reel
(A)

Fig. A

Fig. B

Fig. 4-10-2

1-4-11. T-Soft Brake Replacement

1. Remove the T-soft brake spring from the hook (2) of the main base.
2. Move the claw (3) of the T-soft brake in the direction of the arrow and remove the T-soft brake upward.
3. Remove the T-soft brake spring from the T-soft brake.
4. Mount a new T-soft brake by reversing above procedures.

Note:

- When mounting the T-soft brake spring on the T-soft brake, attach the opening side (1)' of the hook to hole (1) so that the opening will face upward.
- Take care in replacement not to touch the brake pad surface.

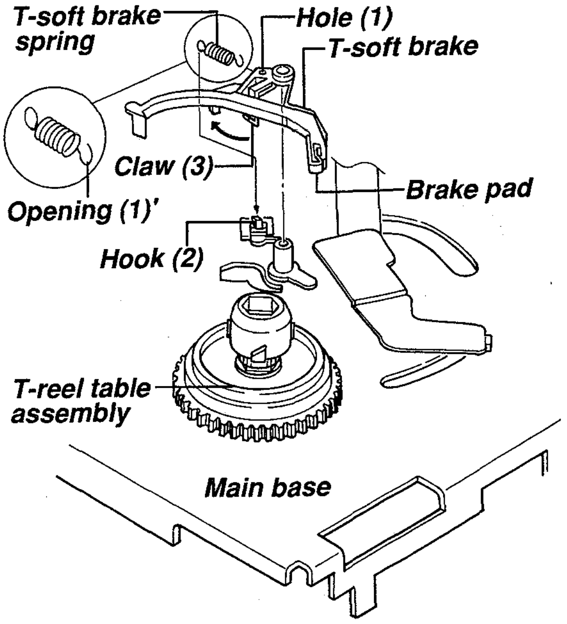

T-soft brake spring
Hole (1)
T-soft brake
Claw (3)
Opening (1)'
Brake pad
Hook (2)
T-reel table assembly
Main base

Fig. 4-11-1 T-soft brake replacement

1-4-12. Idle Arm Assembly Replacement

1. Remove the cap (1) and remove the idle arm assembly upward.
2. Remount a new idle arm assembly so that the protruded part (A) of the idle arm kick lever may fit into the concave part (A) on the idle arm assembly.
3. Mount the cap (1).

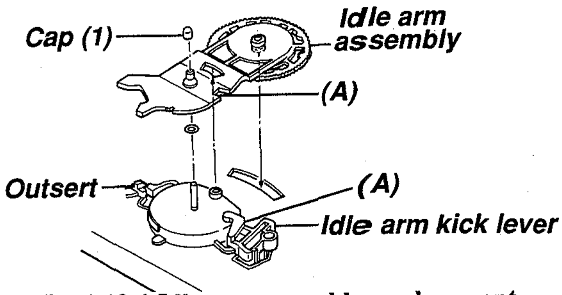

Cap (1)
Idle arm assembly
(A)
Outsert
(A)
Idle arm kick lever

Fig. 4-12-1 Idle arm assembly replacement

1-4-13. S, T-Reel Table Replacement

(1) (S)Supply reel table assembly replacement

1. Remove the S-soft brake. (Refer to item "1-4-9. S-Soft Brake Assembly Replacement".)
2. Remove the tension regulator assembly. (Refer to item "1-4-26. (1) Tension regulator assembly replacement".)
3. Remove the stop ring (1) and remove the S-reel table assembly upward.
4. After cleaning the reel shaft with a cleaning kit, lubricate it with one or two drops of oil using lubrication oil kit.
5. Replace the S-reel table in the reverse order of removal.

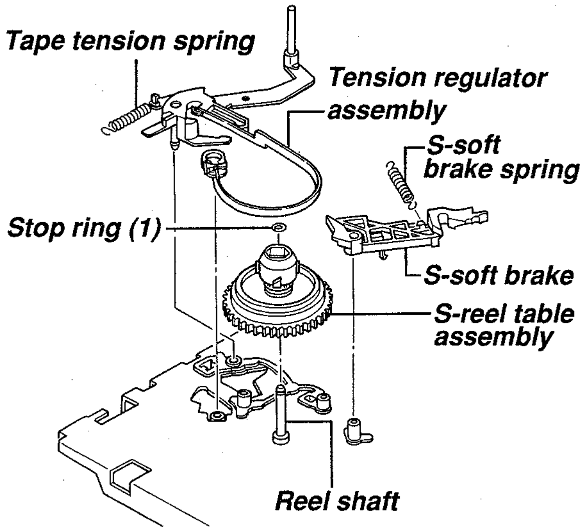

Tape tension spring
Tension regulator assembly
S-soft brake spring
Stop ring (1)
S-soft brake
S-reel table assembly
Reel shaft

Fig. 4-13-1 Supply reel table assembly replacement

(2) (T)Take-up reel table assembly replacement

1. Remove the T-soft brake. (Refer to item "1-4-11. T-Soft Brake Replacement".)
2. Remove the stop ring (1) and remove the T-reel table assembly upward.
3. After cleaning the T-reel shaft with a cleaning kit, apply it with one or two drops of lubrication oil kit. Apply oil also to the base (A) of the T-reel shaft.
4. Replace the T-reel table assembly in the reverse order of removal.

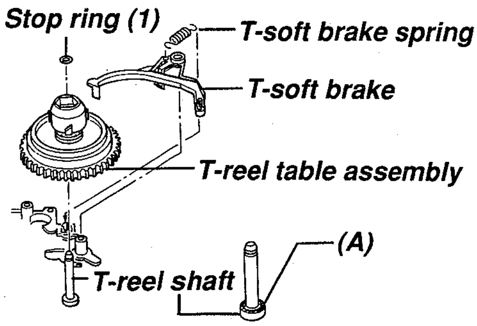

Stop ring (1)
T-soft brake spring
T-soft brake
T-reel table assembly
(A)
T-reel shaft

Fig. 4-13-2 Take-up reel table assembly replacement

1-4-14. Clutch System Parts Replacement

(1) Clutch assembly replacement

1. Turn the deck upside-down and remove the reel belt.
2. Remove two screws (1) and remove the clutch holder.
3. Remove the clutch assembly upward.
4. Clean the clutch post using the cleaning kit, and then apply one or two drops of lubrication oil kit after confirming that the washer (2) is inserted into the clutch post.
5. When remounting, use the reverse procedures.
6. Check the reel torque, using the torque cassette. (Refer item "1-5-3".)

Note:

- When remounting the clutch assembly on the deck, each protruded part of the clutch assembly, (A) and (B), should match each hole on the main base according to size.
- When remounting, take care the belt is not twisted.
- Do not deform the clutch holder. And, the hole (3) makes to be hooked by the clutch post groove.

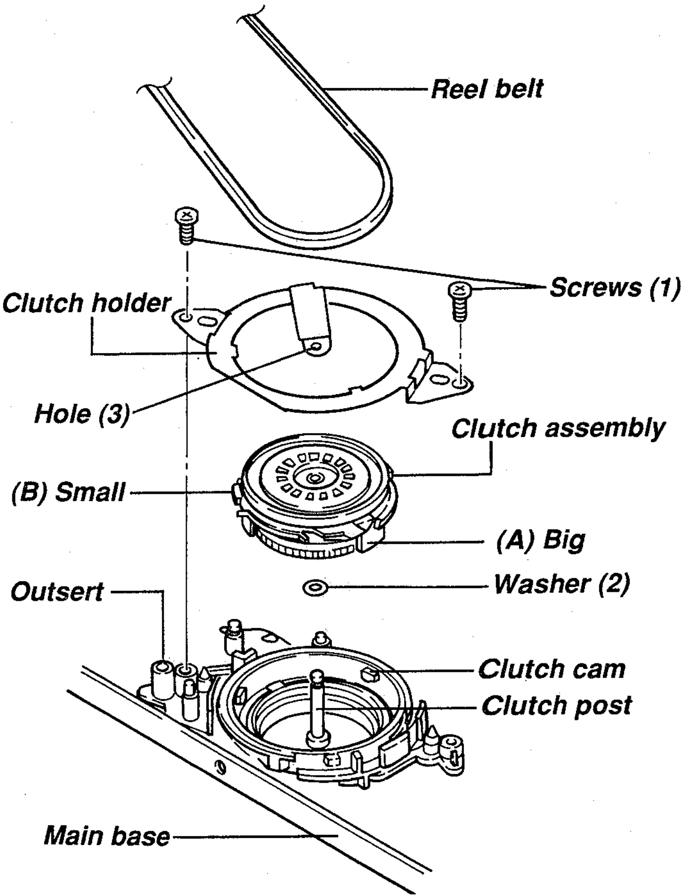

Reel belt
Screws (1)
Clutch holder
Hole (3)
Clutch assembly
(B) Small
(A) Big
Washer (2)
Outsert
Clutch cam
Clutch post
Main base

Fig. 4-14-1 Clutch assembly replacement

(2) Clutch cam replacement

1. Turn the deck upside-down and remove the reel belt.
2. Remove the clutch assembly according to the replacing procedures. (Refer to item " 1-4-14. (1) Clutch Assembly Replacement".)
3. Remove the clutch cam.
4. Remount a new clutch cam by reversing the removal procedures.
5. When replacing, apply grease to the whole outer surface of three protruded portions (4) of the clutch cam.

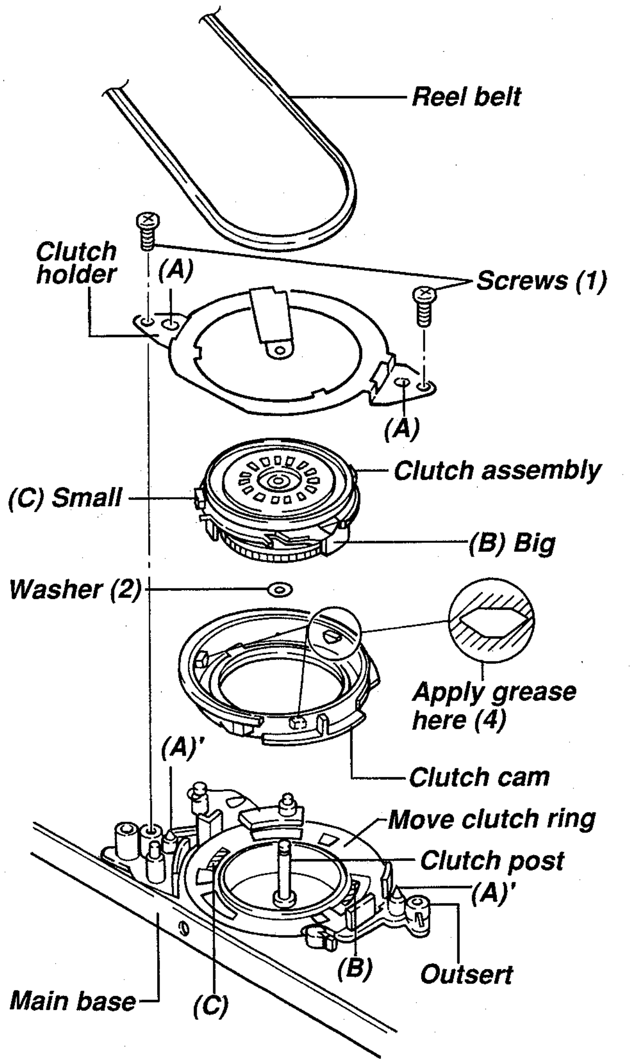

Reel belt
Clutch holder
(A)
Screws (1)
(A)
Clutch assembly
(C) Small
(B) Big
Washer (2)
Apply grease here (4)
(A)'
Clutch cam
Move clutch ring
Clutch post
(A)'
(B)
Outsert
Main base
(C)

Fig. 4-14-2 Cam clutch replacement

<Clutch cam installation>

(Refer to Fig. 4-14-3.)

Note:

- Check that the move clutch ring has not floated from main base before attaching the clutch cam.
- Move the boss (3) in the direction of the arrow.
- Align the O mark on the gear of the clutch cam and the Δ mark on the cam gear.
- Insert the end of the rec-inhibiting lever between the outsert wall and the clutch cam wall.

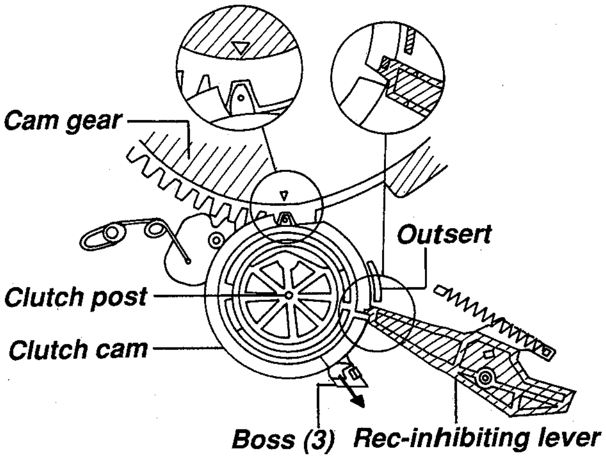

Cam gear
Outsert
Clutch post
Clutch cam
Boss (3)
Rec-inhibiting lever

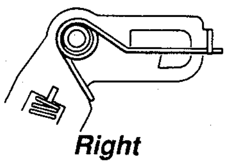
Fig. 4-14-3

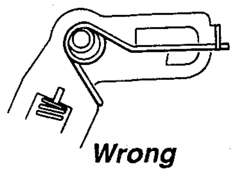
1-4-15. Pinch Roller Replacement

1. Remove the T-soft brake. (Refer to item "1-4-11. T-soft Brake Replacement".)
2. Remove the S-soft brake. (Refer to item "1-4-9. S-soft Brake Replacement".)
3. Turn the main base upside-down.
4. Remove the stop ring (1).
5. Place the main base with the right side up.
6. Remove the pinch roller assembly and the pinch torsion spring.
7. Apply grease to a new pinch roller assembly. (Refer to "Apply grease (2)".)
8. Attach the pinch torsion spring to the pinch lever assembly and then slightly insert the shaft of the pinch lever assembly into the sleeve hole (3) on the main base.
9. Remove the pinch lever spring from the hook of the pinch lever assembly, hook it on the post (4) and then insert the pinch lever assembly deeper into the sleeve.
10. Turn the main base upside-down with the pinch lever assembly still held from the right side of the main base.
11. Mount the stop ring on the shaft.
12. Place the main base with the right side up and attach the T and S-soft brakes.

Note:

- When attaching the pinch roller assembly, the pinch torsion spring may detach. At this time, after removing once the pinch roller assembly, put pinch torsion spring again and attach pinch roller again.





- Take care not to touch the pinch roller, or not to soil it.

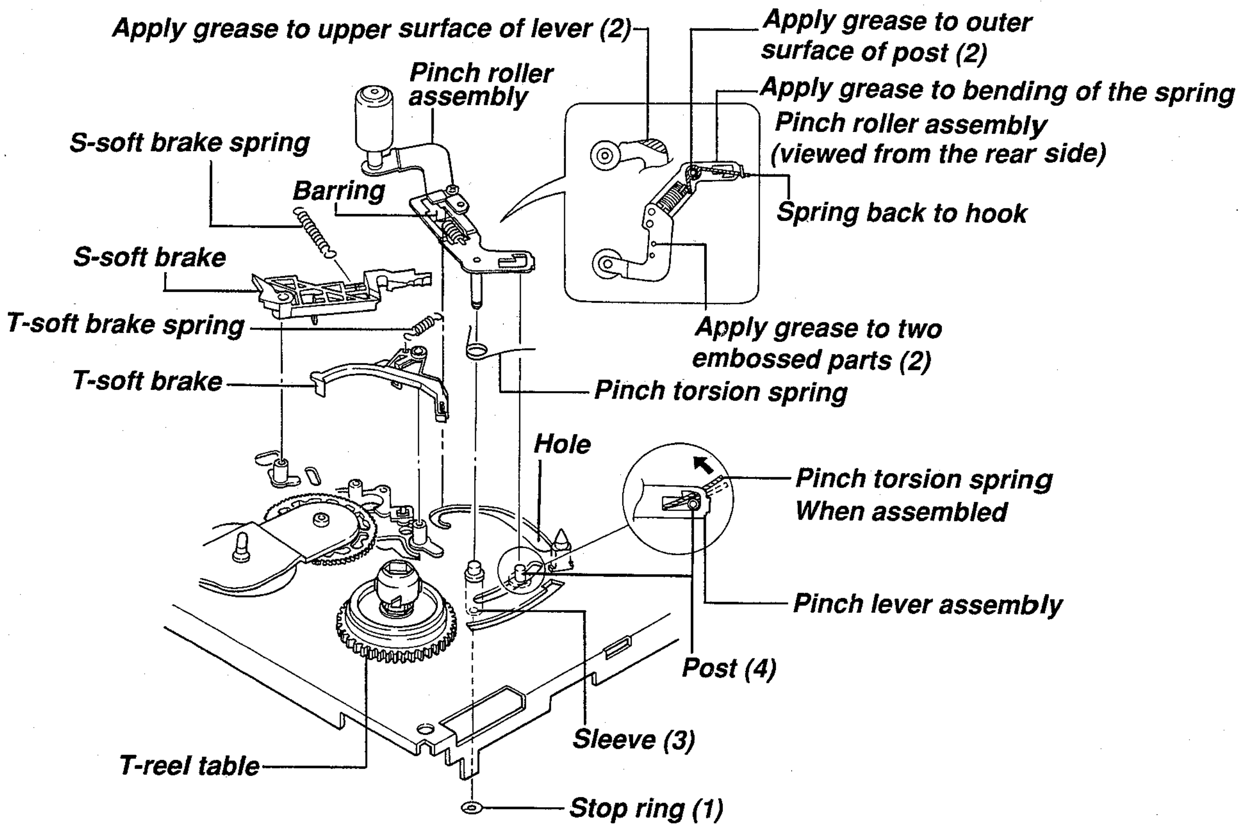

Apply grease to upper surface of lever (2)
Apply grease to outer surface of post (2)
Pinch roller assembly
Apply grease to bending of the spring
Pinch roller assembly (viewed from the rear side)
S-soft brake spring
Barring
Spring back to hook
S-soft brake
T-soft brake spring
Apply grease to two embossed parts (2)
T-soft brake
Pinch torsion spring
Hole
Pinch torsion spring When assembled
Pinch lever assembly
Post (4)
Sleeve (3)
T-reel table
Stop ring (1)

Fig. 4-15-1

1-4-16. Cam Gear Replacement

1. Remove the S-soft brake. (Refer to item "1-4-9. S-Soft Brake Replacement".)
2. Turn the main base upside-down.
3. Remove the clutch holder, clutch assembly and the clutch cam. (Refer to item "1-4-14. Clutch System Parts Replacement".)
4. Remove stop ring (3) and remove the relay gear.
5. Remove stop ring (1) and remove the cam gear upward.
6. Apply grease to a new cam gear. (Refer to Fig. 4-16-2 "View of cam gear".)
7. Press the T-loading link assembly and the S-loading link assembly in the direction of the arrows (A) and (B) respectively.
8. Set the hole (D) on the drive mode slider, hole (E) on the band brake lever and the hole (F) on the P. OSC drive lever, respectively, to each hole on the main base.
9. Press the moving clutch lever in the direction of the arrow (G).
10. Move the claw (1) in the direction of the arrow (C) and mount the cam gear so that the hole (H) on the cam gear can match the hole on the main base.
11. When reassembling, used the removing steps in the reverse order.
12. After completion of the assembly, make sure by turning the loading belt that the cam gear and its peripheral parts can function properly.

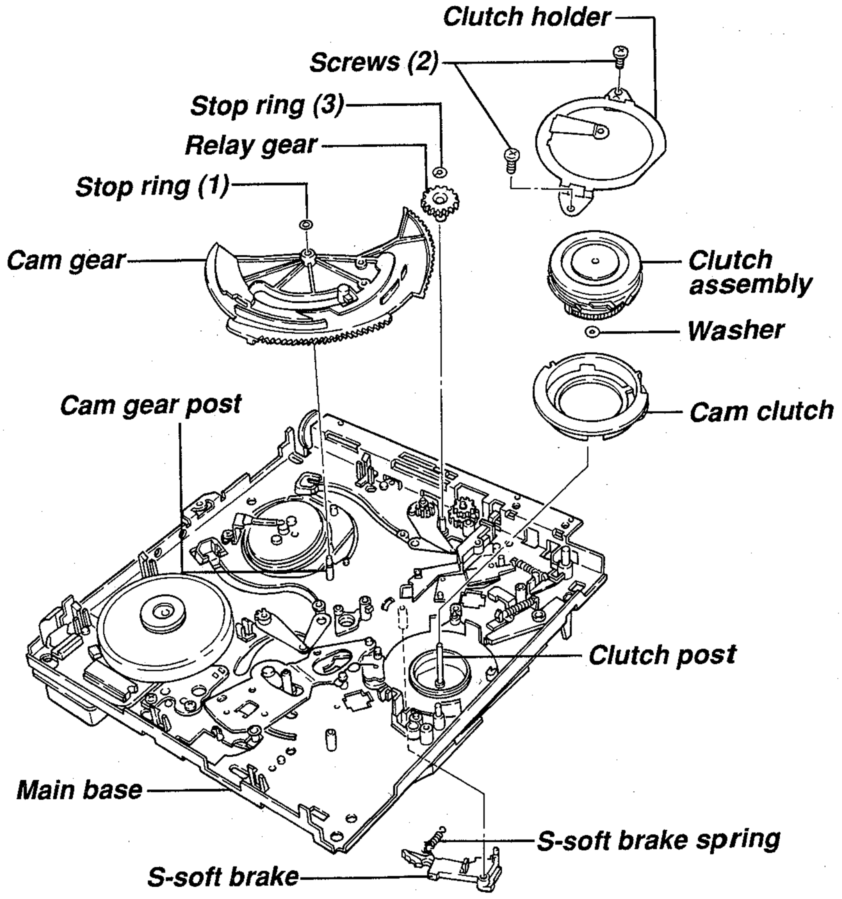

Clutch holder
Screws (2)
Stop ring (3)
Relay gear
Stop ring (1)
Cam gear
Clutch assembly
Washer
Cam gear post
Cam clutch
Clutch post
Main base
S-soft brake spring
S-soft brake

Fig. 4-16-1

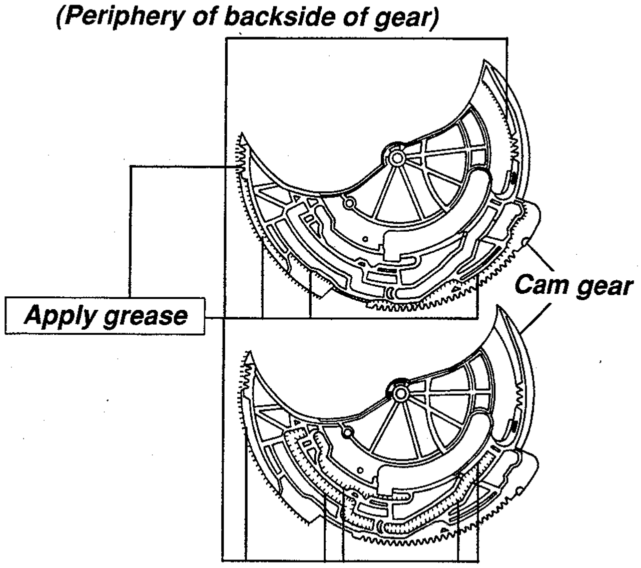

(Periphery of backside of gear)
Apply grease
Cam gear

Fig. 4-16-2 View of cam gear

Note:
The parts enclosed in a square require to perform phase matching with the cam gear.

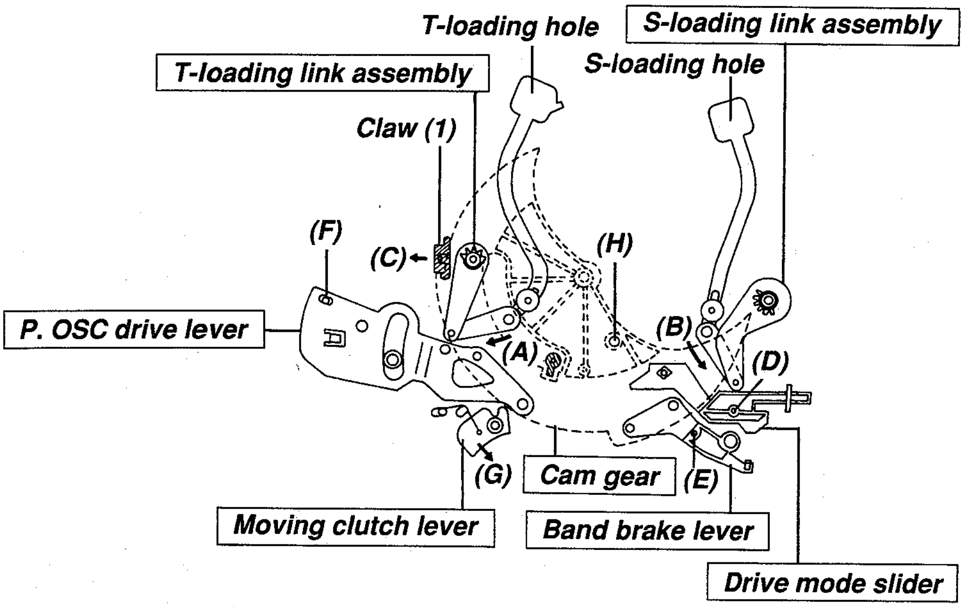

T-loading hole
S-loading link assembly
T-loading link assembly
S-loading hole
Claw (1)
(F)
(C)
(H)
P. OSC drive lever
(B)
(A)
(D)
(G)
Cam gear
(E)
Moving clutch lever
Band brake lever
Drive mode slider

Fig. 4-16-3 Phase matching in assembling the cam gear

1-4-17. P. OSC Drive Lever Replacement

1. Remove the S-soft brake. (Refer to item "1-4-9. S-Soft Brake Replacing".)
2. Remove the T-soft brake to dismount the pinch roller assembly and the torsion spring. (Refer to item "1-4-15. Pinch Roller Assembly Replacing".)
3. Turn the main base upside-down.
4. Remove the stop ring (1) and remove the relay gear. (Refer to item "1-4-18. Relay Gear Replacement".)
5. Remove the clutch holder, clutch assembly and the clutch cam. (Refer to item "1-4-14. (2) Clutch cam Replacement".)
6. Remove stop ring (2) and bend the claw (3) in the direction of the arrow (A) to remove the cam gear upward. (Refer to item "1-4-6. Cam Gear Replacement".)
7. Remove the P. OSC drive lever in the direction of the arrow (B).
8. Apply grease to portion (4) at the new P. OSC drive lever. (Refer to Fig 4-17-2)
9. Replace the P. OSC lever by reversing above procedures. When installing, insert the barring (6) of the P. OSC drive lever into the hole (5) on the main base and also insert the lock plate of the P. OSC drive lever into the hole (7) on the main base in the direction of the arrow (C).

1-4-18. Relay Gear Replacement

1. Remove stop ring (1) and remove the relay gear upward.
2. Apply grease to the periphery of the gear (two parts) of the new relay gear. Also apply grease to the outer surface of the relay post.
3. Remount the relay gear in the reverse order of removal. (Note: Gear phase can be adjusted arbitrarily.)

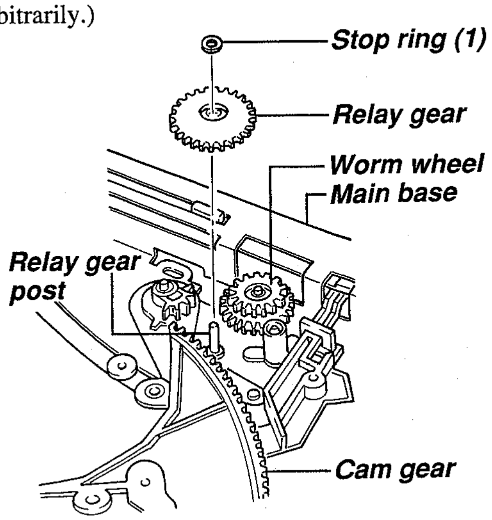

Stop ring (1)
Relay gear
Worm wheel
Main base
Relay gear post
Cam gear

Fig. 4-18-1 Relay gear replacement

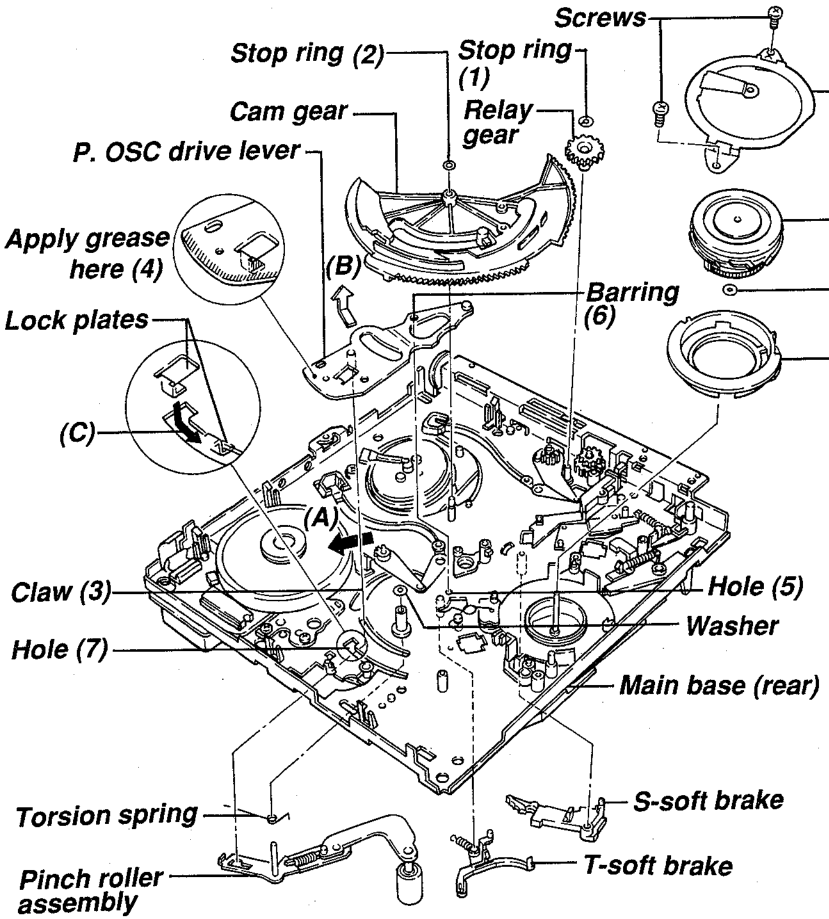

Screws
Stop ring (2)
Stop ring (1)
Cam gear
Relay gear
P. OSC drive lever
Clutch holder
Apply grease here (4)
(B)
Clutch assembly
Barring (6)
Washer
Lock plates
Cam clutch
(C)
(A)
Claw (3)
Hole (5)
Washer
Hole (7)
Main base (rear)
Torsion spring
S-soft brake
Pinch roller assembly
T-soft brake

Fig. 4-17-1 P. OSC lever replacement

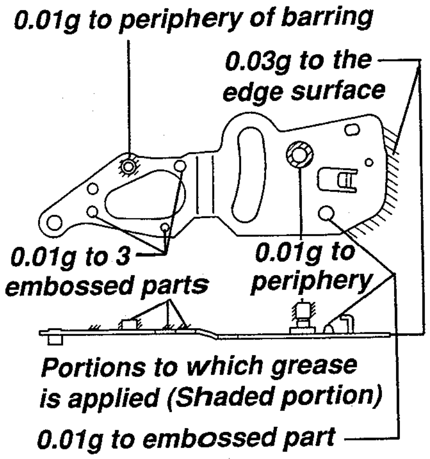

0.01g to periphery of barring
0.03g to the edge surface
0.01g to 3 embossed parts
0.01g to periphery
Portions to which grease is applied (Shaded portion)
0.01g to embossed part

Fig. 4-17-2

1-4-19. S, T-Loading Link Assemblies Replacement

1. Remove the clutch holder, clutch assembly and the clutch cam. (Refer to item "1-4-14. (2) Clutch cam Replacement".)
   In this case, the main base is turned upside-down.
2. Remove the relay gear. (Refer to item "1-4-18. Relay Gear Replacement".)
3. Remove the cam gear. (Refer to item "1-4-16. Cam Gear Replacement".)
4. Place the main base with the right side up.
5. Remove the stopper slider (2) and the torsion spring (4) from the S-slider. (When replacing the T-loading link assembly, remove the slider stopper (3) and the torsion spring (5) from the T-slider.)
6. Turn the main base upside-down.
7. Remove the stop ring (1) and remove the S-loading link assembly.
   (When replacing the T-loading link assembly, remove the T-load link assembly.)
8. When remounting, use the reverse procedures.

Note:
For items 5. - 8., refer to item "1-4-3. (6) S, T-sliders replacement".)

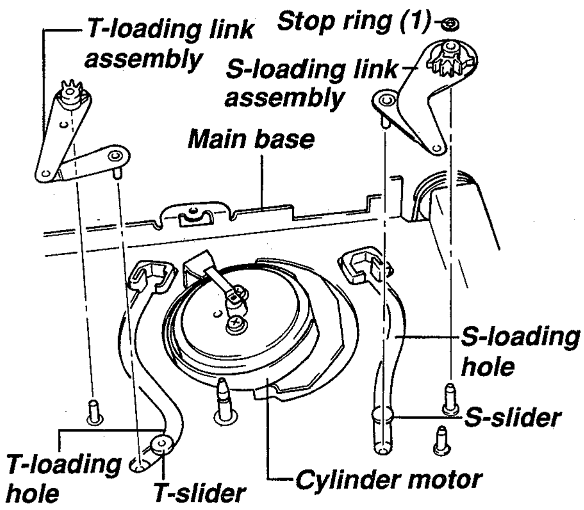

T-loading link assembly
Stop ring (1)
S-loading link assembly
Main base
S-loading hole
S-slider
T-loading hole
T-slider
Cylinder motor

Fig. 4-19-1 T, S-loading link assemblies replacement

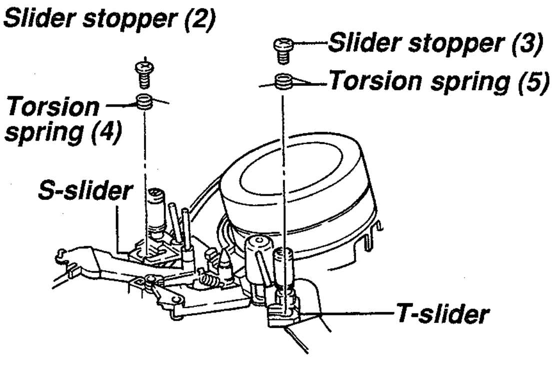

Slider stopper (2)
Slider stopper (3)
Torsion spring (5)
Torsion spring (4)
S-slider
T-slider

Fig. 4-19-2

1-4-20. Worm Wheel Replacement

1. Remove the S-main brake and T-main brake and then remove the main brake charge lever. (Refer to item "1-4-7. (2) Main brake charge lever replacement".)
2. Remove the loading belt and then loading motor assembly. (Refer to item "1-4-4. Loading Motor Assembly Replacement".)
3. Remove the drive shaft assembly. (Refer to item "1-4-6. Drive Shaft Assembly Replacement".)
4. Remove the relay gear by detaching the stop ring (2) (Refer to item "1-4-18. Relay Gear Replacement".)
5. Remove the worm wheel by detaching the stop ring (1).
6. Apply grease the outer surface of the gear (2 portions) of the new worm wheel. Also apply grease to the periphery of the gear post.
7. Remount the worm wheel in the reverse order of removal.
   (Gear phase can be adjusted arbitrarily.)

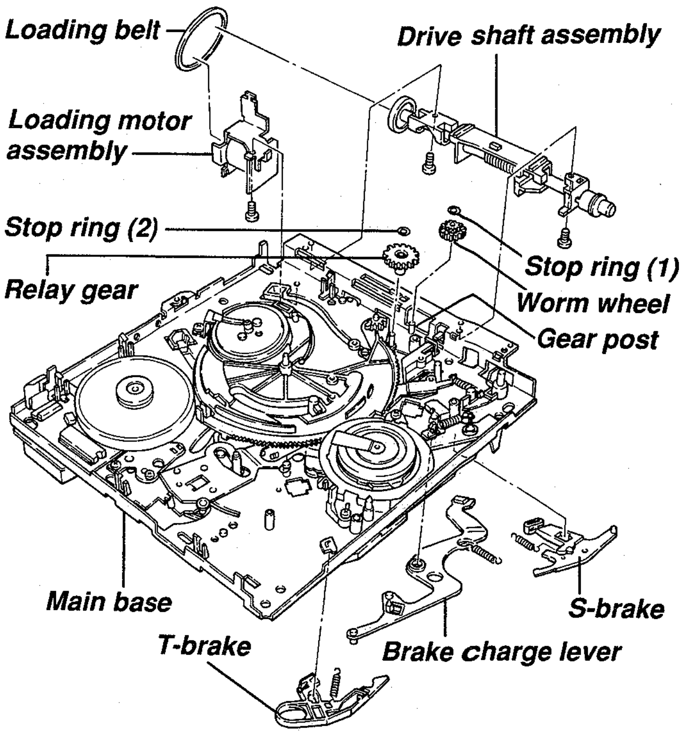

Loading belt
Drive shaft assembly
Loading motor assembly
Stop ring (2)
Relay gear
Stop ring (1)
Worm wheel
Gear post
Main base
S-brake
T-brake
Brake charge lever

Fig. 4-20-1

1-4-21. OSC Drive Lever Replacement

1. Remove the T-soft brake. (Refer to item "1-4-11. T-Soft Brake Replacement".)
2. Remove the S-soft brake. (Refer to item "1-4-9. S-Soft Brake Replacement".)
3. Remove the pinch roller assembly. (Refer to item "1-4-15. Pinch Roller Replacement".)
4. Remove the OSC guide lever and the torsion spring (2) by detaching the nut (1). (Refer to item "1-4-3. (9) OSC guide lever assembly replacement".)
5. Remove the OSC drive lever in the direction of the arrow (B). (Refer to Fig. 4-21-2.)
6. Remount the OSC drive lever in the reverse order of removal.
7. When the OSC guide lever is removed, perform the OSC guide lever adjustment. (Refer to item "1-5-4 (3),(5)")

Note:

Align the ○ mark shown by (A)' on the OSC drive lever and the gear (A) at the left end of the OSC lever.

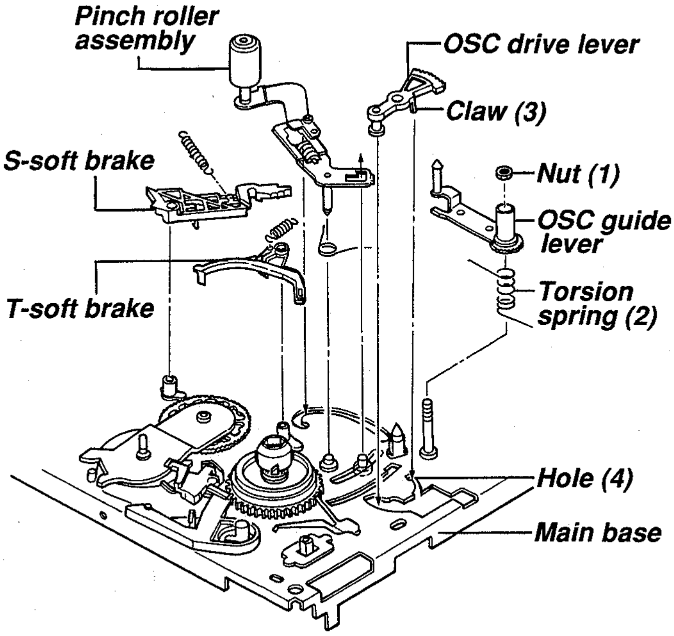

Pinch roller assembly
OSC drive lever
Claw (3)
S-soft brake
Nut (1)
OSC guide lever
T-soft brake
Torsion spring (2)
Hole (4)
Main base

Fig. 4-21-1

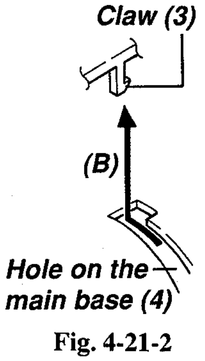

Claw (3)
(B)
Hole on the main base (4)

Fig. 4-21-2

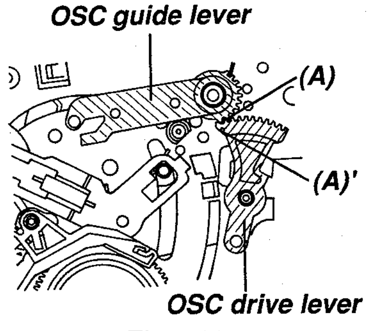

OSC guide lever
(A)
(A)'
OSC drive lever

Fig. 4-21-3

1-4-22. Band Brake Lever Assembly Replacement

1. Remove the tension regulator assembly, band brake assembly and the band holder as a unit at a time. (Refer to item "1-4-26 (1), (2), (4)".)
2. Turn the deck upside-down and remove the cam gear. (Refer to item "1-4-16".)
3. Remove the spring, taking care that the spring is not stretched or deformed. Slide the mode drive slider in the direction of the arrow A.
4. Energize the tension spring lever in the direction of the arrow (B) and remove the band brake lever assembly.
5. Remount a new band brake lever assembly by reversing above procedures.
6. After all parts are assembled, check position of the tension pole and its adjustment and check the back tension. (Refer to items "1-5-2. and 1-5-3.".)

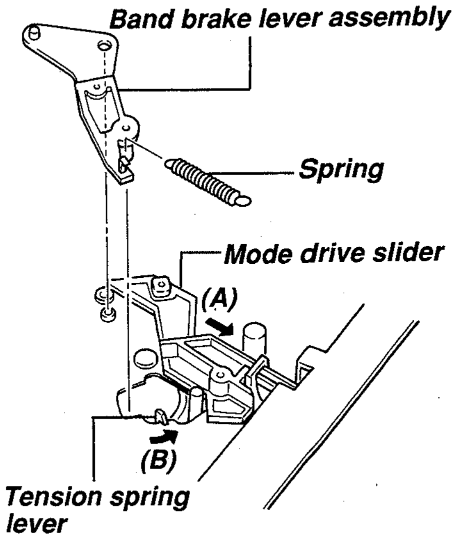

Band brake lever assembly
Spring
Mode drive slider
(A)
(B)
Tension spring lever

Fig. 4-22-1

1-4-23. Mode Drive Slider Replacement

1. Remove the cam gear. (Refer to item "1-4-16.".)
2. Remove the band brake lever assembly. (Refer to item "1-4-22.".)
3. Move the mode drive slider to the left and pull it upward (Refer to Fig. 4-23-1).
4. Replace the mode drive slider in the reverse order of removal.

Precautions in the installation: (Refer to Fig. 4-23-2)

- Make sure that the mode drive slider is gripped in the claw of the outsert on the main base (The band brake lever is attached).
- Make sure that the mode drive slider is gripped in the claw on the tension spring lever.

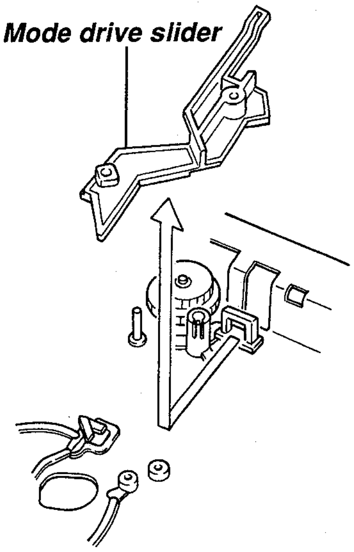

Mode drive slider

Fig. 4-23-1

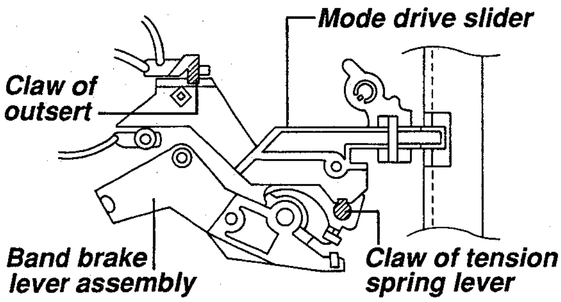

Mode drive slider
Claw of outsert
Band brake lever assembly
Claw of tension spring lever

Fig. 4-23-2

1-4-24. Cassette-In Lever Replacement

1. Remove the spring from the hooks of the cassette-in lever and the band brake lever assembly, taking care not to stretch or deform the spring.
2. Off-hook the claw hooked on the main base to remove the cassette-in lever.
3. When remounting the cassette-in lever, use the above steps in reverse order.

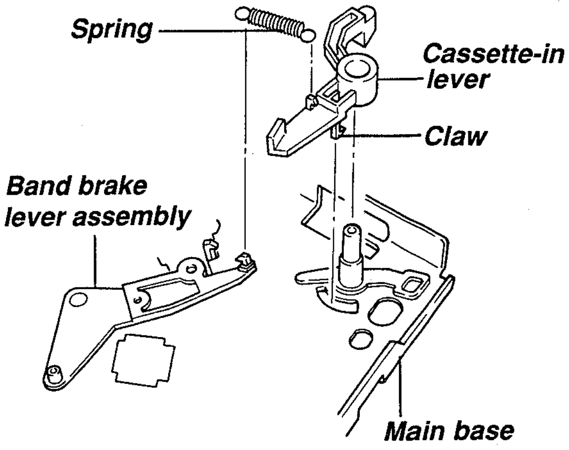

Spring
Cassette-in lever
Claw
Band brake lever assembly
Main base

Fig. 4-24-1 Cassette-in lever replacement

1-4-25. Rec-Inhibiting Lever Replacement

1. Remove the clutch cam. (Refer to item "1-4-14. (2)".)
2. Remove the spring from the hooks of the main base and the rec-inhibiting lever, taking care not to stretch or deform the spring.
3. Off-hook the claw hooked on the main base and remove the rec-inhibiting lever.
4. Replace the rec-inhibiting lever by reversing above procedures.
5. Install the clutch cam. (Refer to item "1-4-14. (2)".)
6. Reinstall the clutch assembly and clutch holder. (Refer to item "1-4-14. (1)".)

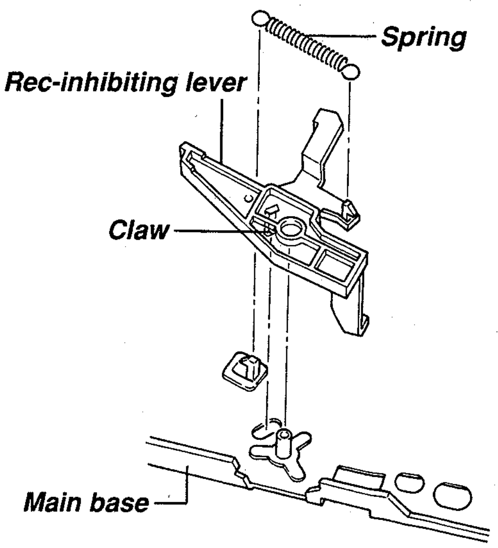

Spring
Rec-inhibiting lever
Claw
Main base

Fig. 4-25-1

1-4-26. Tension Regulator Parts Replacement

(1) Tension regulator assembly replacement

1. Remove the S-soft brake. (Refer to item "1-4-9.".)
2. Remove the tension spring, taking care not to stretch or deform the spring.
3. Off-hook the claw of the outsert at the main base hooked on the shaft of the tension regulator assembly and remove the tension regulator assembly upward. Note that the outsert hook at the main base is not deformed.
4. Remove the band brake from the hook of the tension regulator assembly. Take care that the felt surface of the band brake is not stained, bent or damaged.
5. Clean the shaft of a new tension regulator assembly and then apply one or two drops of oil. When replacing the tension regulator, perform the previous steps in reverse order.
   Take care not to apply oil to the tension pole.
6. Check position of the tension pole and its adjustment and check the back tension. (Refer to items "1-5-2. and 1-5-3.".)

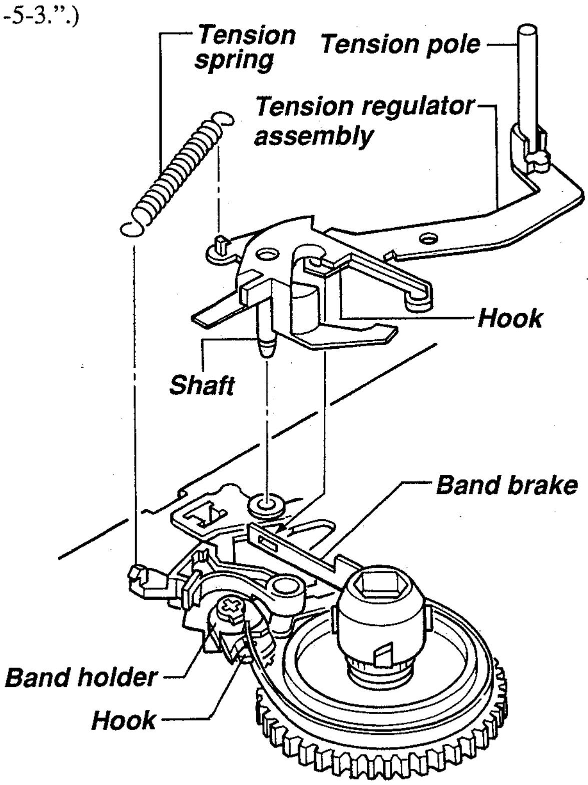


Fig. 4-26-1

(2) Band brake replacement

1. Remove the S-soft brake. (Refer to item "1-4-9.".)
2. Remove the tension regulator. (Refer to item "1-4-26. (1)".)
3. Remove the band brake from the hook of the band holder.
4. When reinstalling a new band brake, perform the previous steps in the reverse order. Take care not to stain or damage the band brake.
5. Check position of the tension pole and its adjustment and check the back tension. (Refer to items "1-5-2. and 1-5-3.".)

(3) Tension spring lever replacement

1. Remove the tension spring, taking care not to stretch or deform the tension lever.
2. Move the tension spring lever close to the portion shown by the arrow A, off-hook the claw hooked on the main base and then remove the tension spring lever upward.
3. Replace the tension spring lever by reversing above procedures.

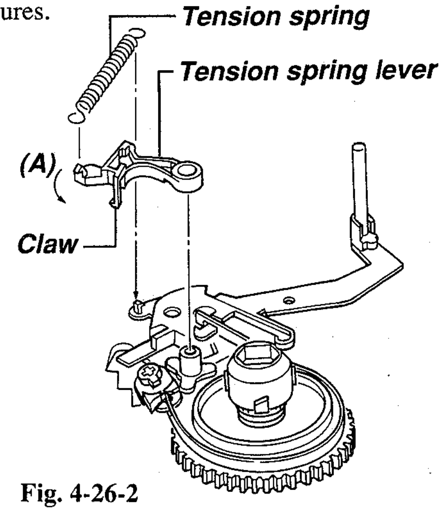


Fig. 4-26-2

(4) Band holder replacement

1. Turn the band holder as shown in Fig. 4-26-3. (so that the protruded part of the band holder nearly matches the hole shape of the band holder.)
2. Remove the band holder upward.
3. Remove the band brake from the hook of the band holder. Take care not to stain, bend or break the band brake.
4. Replace the band holder in the reverse order of removal.
5. Check position of the tension pole and its adjustment and check the back tension. (Refer to items "1-5-2. and 1-5-3.".)

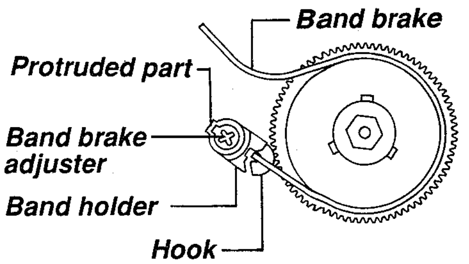


Fig. 4-26-3

1-4-27. Capstan Motor Replacement

1. Remove the FFC (1) for capstan motor and the reel belt (3).
2. Remove the mechanism P. C. board (2) from the rear of the deck. (The screws are not the same, so do not exchange when using.)

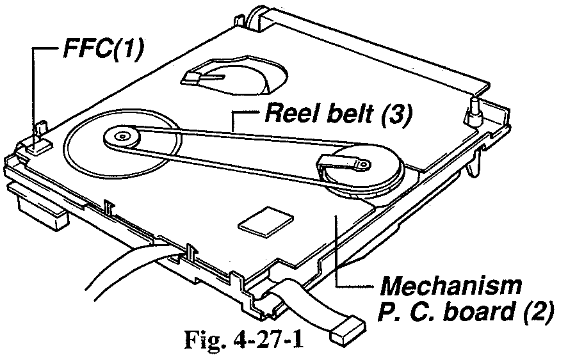

FFC(1)
Reel belt (3)
Mechanism
P. C. board (2)

Fig. 4-27-1

3. Remove the FFC (4) from the capstan motor by sliding the connector holder in the direction shown by the arrow.

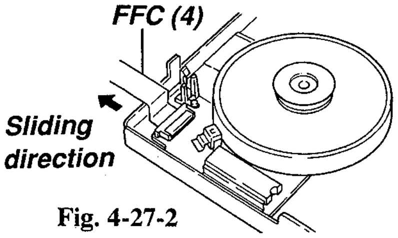

FFC (4)
Sliding
direction

Fig. 4-27-2

4. Hold the capstan motor on the rear of the deck. Remove three screws (5) on the front side of the deck and then remove the motor.

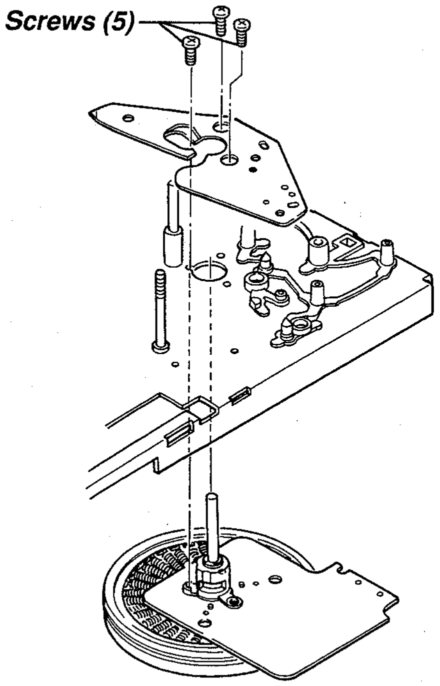


Fig. 4-27-3

5. First, position the capstan motor as shown in the following figure (6) and then mount the motor from the rear side of the deck, taking care not to damage the shaft, motor, etc.

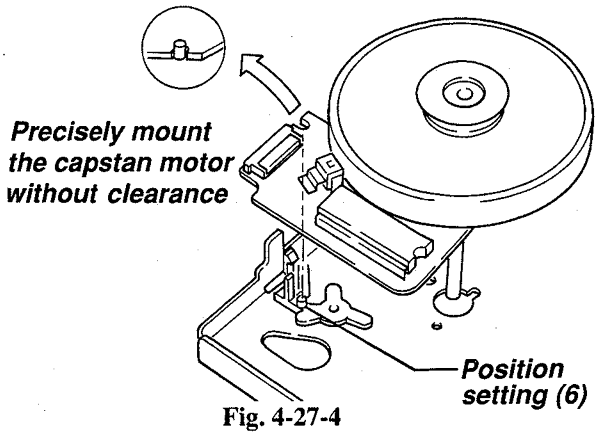

Precisely mount
the capstan motor
without clearance
Position
setting (6)

Fig. 4-27-4

6. Next, secure the capstan motor with three screws from the upper side of the deck. (In this case, do not use the screws once removed. Precisely mount the motor without any clearance.)

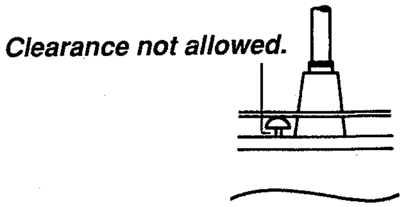

Clearance not allowed.

Fig. 4-27-5

7. Connect the FFC to the motor, taking care of its top and bottom side. It should be inserted with the metal terminal side facing downward. Insert the FFC and securely lock the connector by moving it as shown by the shaded arrow.

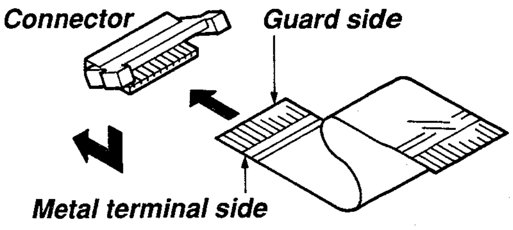

Connector
Guard side
Metal terminal side

Fig. 4-27-6

8. Hereafter, proceed the remounting, using the removing procedures in the reverse order. When remounting, take care that the capstan motor, reel belt, FFC, etc. are not in contact with each other. Also take care the belt is not twisted and stained with grease.
9. After completion of the capstan motor replacement, check the transport characteristics according to the transport adjustment procedure. (Refer to item "1-5-4. (2)".)

1-4-28. Cap Thrust Replacement

1. Remove the screw (1) and then remove the cap thrust (2).
2. When the cap thrust is replaced, position the cap thrust referring to the hole so that the contact part (3) is just above the capstan shaft.

Note:

- Take care not to deform the plate spring of cap thrust.

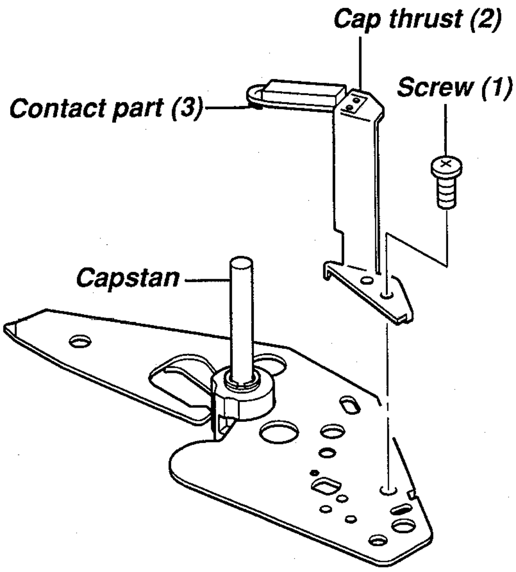

Cap thrust (2)
Contact part (3)
Screw (1)
Capstan

Fig 4-28-1

1-4-29. Ground Brush Replacement

1. Remove the screw (1) and then remove the brush.
2. Clean the ground cap using alcohol.
3. Place the brush so that it can be contact with the center of the earth cap.

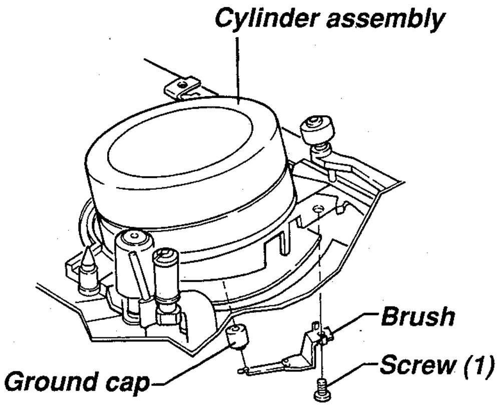

Cylinder assembly
Brush
Ground cap
Screw (1)

Fig. 4-29-1 Brush replacement

1-5. Check and Adjustment

1-5-1. How To Check Mechanism Positions

Turning the pulley of the drive shaft assembly allows to move to each position.
Use the position marks of the cam gear and the projection of the main base boss as guideline.

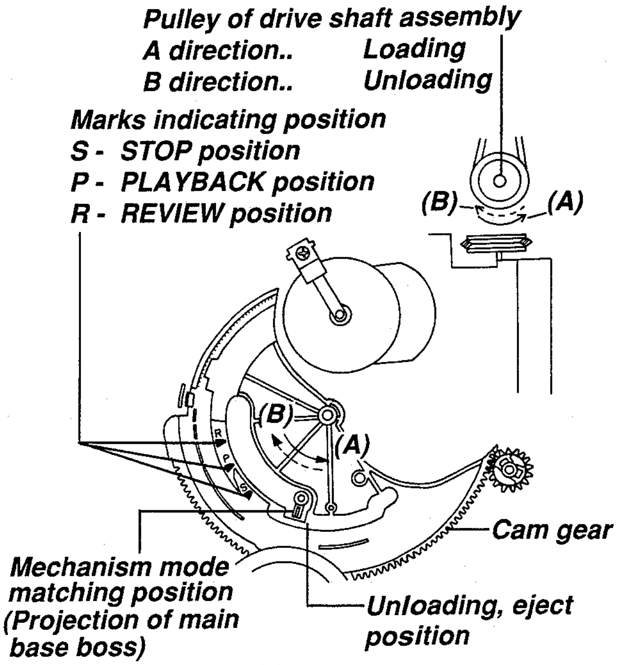

Pulley of drive shaft assembly
A direction.. Loading
B direction.. Unloading
Marks indicating position
S - STOP position
P - PLAYBACK position
R - REVIEW position
(B)
(A)
(B)
(A)
Cam gear
Mechanism mode matching position (Projection of main base boss)
Unloading, eject position

Fig. 5-1-1

1-5-2. Check of Tension Pole Position

1. Check that the protruded part of band brake adjuster has turned to the direction of the lower right.
2. Set the deck to the play mode with the front loading assembly removed. (Shift the mode by referring to item "1-5-1. How To Check Mechanism Positions.)
3. Turn the S-reel table 3-4 turns in the clockwise direction.
4. Make sure the peripheral of the outsert (shown by shaded arrow) of the tension regulator assembly is 1mm ± 0.5mm away from the main base edge as shown in Fig. 5-2-1.
5. If necessary, adjust the position by turning the band brake adjuster in the direction shown by ↔. After the adjustment, check to see the tension pole position by turning the S-reel table 3 – 4 turns clockwise.

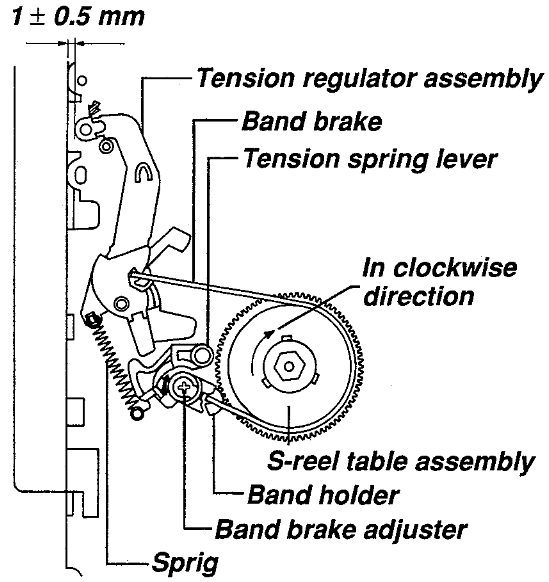


Fig. 5-2-1

1-5-3. Reel Torque Check

(1) Reel torque

1. REVIEW mode
   Poor torque may not wind the tape. On the other hand, excessive torque will cause damage to the tape during REVIEW mode.
2. Record/Playback (take-up side) mode
   Too little torque does not rewind the tape to the end. If too large torque the tape may be stretched by excessive tension.
3. Inspection
   Rewind the torque cassette (recorded in SP mode) to the end, then check the torque values shown below:

Review	212.5 ± 77.5g-cm
Record/Playback	85 ± 25g-cm

   For checking the method, refer to the following item (2).

(2) Reel torque and back tension check

1. First, record a TV broadcast program on the entire torque cassette tape (KT-300NR) in the SP mode.
2. Load the torque cassette in the VTR and feed forward the tape before proceeding with measurement.
3. Set the VTR to the REVIEW mode and feed the tape for about 15 sec., and then make sure the take-up torque of 135 ~ 290g-cm is obtained while observing the left torque meter.
4. After completion of step 3, set the VTR to the PLAY mode and feed the tape for about 30 sec. Read the right torque meter and check the torque of 60 ~ 110g-cm is obtained.
5. When the review torque and playback torque are out of limit, replace the clutch assembly.
6. When the clutch assembly and the idle gear are replaced, perform the reel torque check.
7. Confirmation and adjustment of the back tension are performed by using a back tension cassette gauge. First, make sure that the tension pole is positioned correctly. (Refer to item "1-5-2".)
   Load a back tension cassette and set the VTR to the PLAY(SP) mode. Make sure the meter is indicating 30 - 45 gf-cm. If the value is out of limit, first make sure the tension level spring is normal, and then replace the tension regulator assembly as required. (Refer to item "1-4-26".)

<Precautions for Use of Torque Cassette (KT-300NR)>

1. Before loading a torque cassette in a VTR, always remove tape slack. The tape slack can be removed by rotating the reel to its take-up direction. (The tape tends to slack when there is no reel brake actions.)
2. When the torque cassette is loaded, confirm followings:
   - Make sure the tape does not ride up or over the No. 8 cap. If it does, do not eject the tape but bring the tape to its correct position, taking care not to damage the tape.
   - Make sure the tape is not slackened. If slackened, operate the VTR in FF or REV mode and then stop the tape. Then make sure the tape is not slackened again.
   - After above confirmation, proceed to the reel torque adjustments and confirmation.
3. Cautions for removal of torque cassette
   - When removing the torque cassette from the VTR, set the VTR to the STOP mode and wait for several seconds. Then, make sure the tape is not slackened. Push the EJECT button to remove the cassette.
   - When removing the torque cassette from the VTR, also make sure the tape is not slackened inside the cassette lid before pulling the cassette from the VTR. If the tape is slackened inside the lid, carefully bring the tape in place and then pull the cassette.
4. If the previous precautions 1, 2 and 3 are not performed properly, the tape may be damaged and correct measurements can not be performed.
5. Do not use worn out or damaged tape, if used they may damage video heads on the cylinder. In such a case always replace the tape with a new one. The replacement tape is of E-180, 6.01 ± 0.3m in length.

1-5-4. Tape Transport System

The tape transport system has been precisely adjusted in the factory, so no check and alignment are necessary except the followings:

- Noises observed on the screen
- Tape damage
- Parts, shown in the adjustment procedures for the tape system, item 1-4-3. were replaced.

Electrical signal output terminal required for adjustment differs depending upon the models. Refer to the test pin location in the Electrical Adjustment Section.

<Adjustment reference>

Lower flange height of No. 8 guide is used as the basic reference for the transport adjustment. To keep height of the No. 8 guide, do not apply excessive force onto the main base to prevent the main base from deformation.

(1) Location of tape transport adjustment

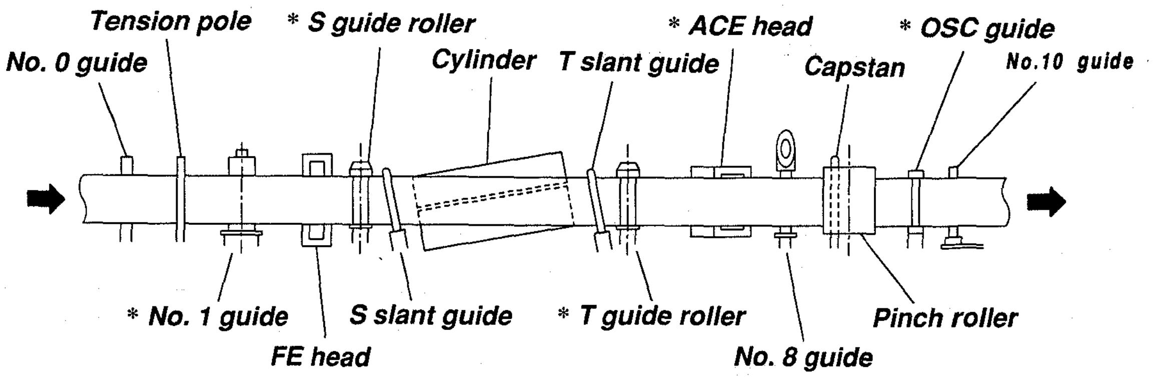

Tension pole
* S guide roller
* ACE head
* OSC guide
No. 0 guide
Cylinder
T slant guide
Capstan
No.10 guide
* No. 1 guide
S slant guide
* T guide roller
Pinch roller
FE head
No. 8 guide

Fig. 5-4-2. Tape travel diagram

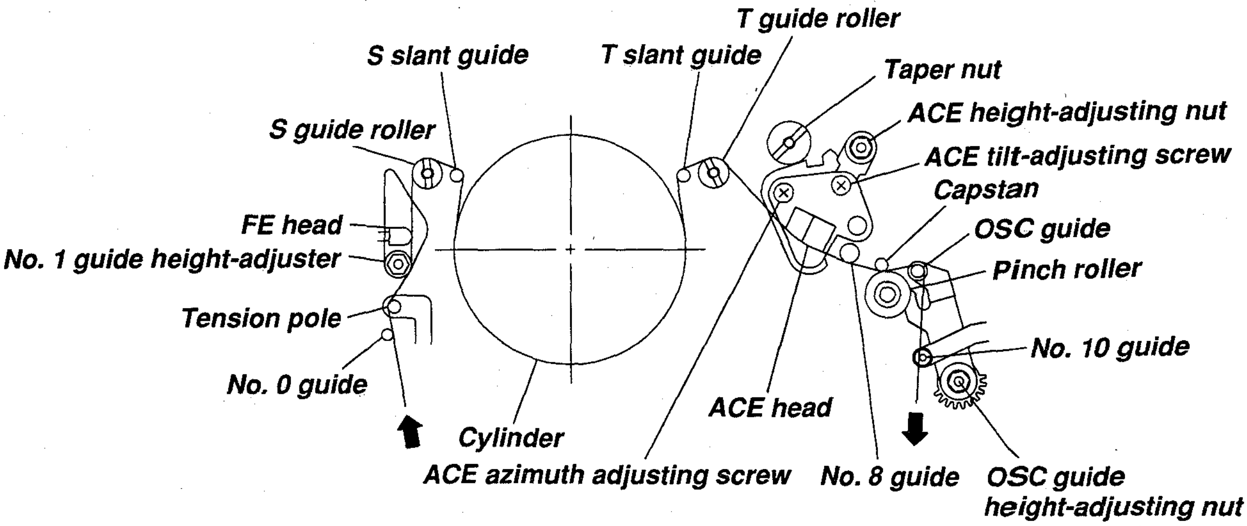

T guide roller
S slant guide
T slant guide
Taper nut
ACE height-adjusting nut
S guide roller
ACE tilt-adjusting screw
Capstan
FE head
OSC guide
No. 1 guide height-adjuster
Pinch roller
Tension pole
No. 10 guide
No. 0 guide
ACE head
Cylinder
ACE azimuth adjusting screw
No. 8 guide
OSC guide height-adjusting nut

Fig. 5-4-1. Location of tape transport adjustment

(3) Tape transport system adjustment

• Pre-adjustment

When the part (s) listed in Table 5-4-1 is replaced, perform required adjustments by referring to procedures for the tape transport system. When the part(s) listed in Table 5-4-1 is replaced, the tape path may be changed and may damage alignment tape. To prevent this, first run a E-240 tape and make sure excessive tape wrinkle does not occur at each tape guide.

1. If tape wrinkle is observed at the S, T-guide rollers, turn the S, T-guide rollers until wrinkle disappears.
2. If tape wrinkle is observed at the No. 8 guide, perform the tilt adjustment of the ACE head.
3. If tape wrinkle is observed at the OSC guide, perform the OSC guide height adjustment.

• Adjustment procedures

1) ACE head assembly coarse adjustment

a. ACE tilt adjustment

1. Play back a E-240 tape and observe running condition of the tape at the lower flange of No.8 guide.
2. Adjust the ACE tilt adjusting screw until tape wrinkle is caused at the lower flange of No. 8 guide as shown in Fig. 5-4-4 (A).
3. Turn the ACE tilt adjusting screw counterclockwise until the tape travels along the lower flange as shown in Fig. 5-4-4 (B).

b. Audio azimuth adjustment

1. Play back the 400Hz and 7kHz audio signals on the alignment tape ST-C4 in the SP mode.
2. Connect a millivoltmeter or oscilloscope to the audio line output terminal.
3. Turn the ACE azimuth adjusting screw to obtain maximum audio output.

c. Audio head height adjustment

1. Run the alignment tape (ST-C4) in the playback mode.
2. Observe surface of the audio head using a dental mirror.
3. Turn the ACE height adjusting nut so that lower tape edge matches to the lower edge of the control head.
4. Play back the 400Hz, 7kHz audio signal in the alignment tape (ST-C4) and adjust the head height for maximum audio output.

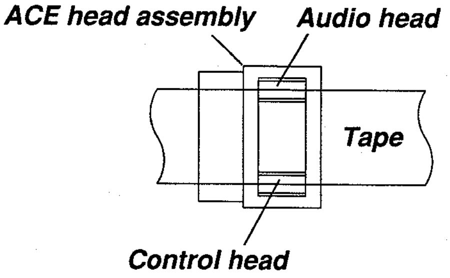


Fig. 5-4-5. Head height

Table 5-4-1

Parts replacement	Adjustment procedure
• Cylinder assembly • S, T-sliders • ACE head • Pinch lever assembly • Capstan motor • OSC guide lever assembly • Taper nut	From item 1)
• Upper cylinder	From item 2)
• S, T-guide rollers • Tension lever assembly • FE head • No. 8 guide sleeve • No. 1 guide	From item 3)
• Reel clutch assembly • S, T-reel tables	From item 4)

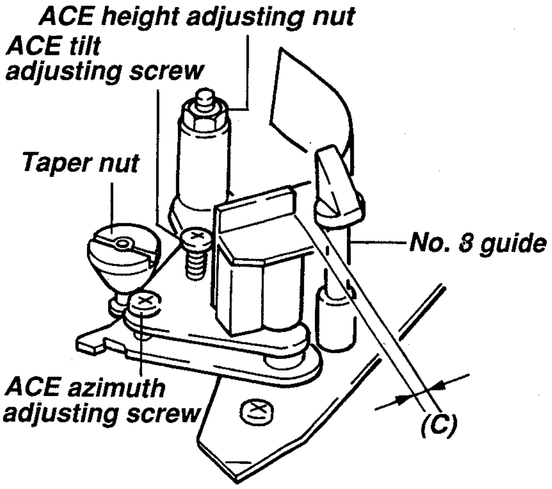


Fig. 5-4-3

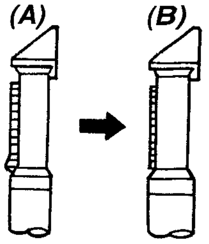


Fig. 5-4-4. Rough check of No. 8 guide

d. ACE head position pre-adjustment

1. Play back the 3MHz video signal in the alignment tape (ST-C4) in the SP mode.
2. Adjust the taper nut for maximum video signal output after the tracking control is set at its center position.

Note:

Confirm from Fig. 5-4-3 that clearance C is provided between the ACE head and No. 8 guide cap as shown in Fig. 5-4-3. (In usual, it is so designed as to leave about 1mm gap.) If there is no clearance, loosen the taper nut and perform the procedure (b) at the position displaced by 1 frame.

2) Playback phase adjustment

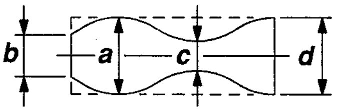
Perform the adjustment according to the methods stated in the electrical adjustment (servo circuit).

3) Linearity adjustment

1. Play back the LP mode 3MHz video signal on the alignment tape (ST-C3).
2. Trigger the scope with the switching pulse to issue the envelope signal output.
3. Make sure the video envelope waveform (in its maximum output) meets the specification shown in Fig. 5-4-6. Again make sure the same by playing back the SP mode 3MHz video signal on the alignment tape ST-C4. If not satisfied, adjust as follows:

Note:

a = maximum output of the video RF envelope
b = minimum output of the video RF envelope at the entrance side
c = minimum output of the video RF envelope at the center point of cylinder
d = minimum output of the video RF envelop at the exit side of cylinder



c, b, d/a ≧ 0.75 (Model corresponding to S-VHS)
b, d/a ≧ 0.63
c/a ≧ 0.75
(Model not corresponding to S-VHS)

Fig. 5-4-6. Envelope waveform adjustment

4. If the A section in Fig. 5-4-7 does not meet the specifications, adjust the S-guide roller in up or down direction.
5. If the B section in Fig. 5-4-7 does not meet the specifications, adjust T-guide roller in up or down direction.

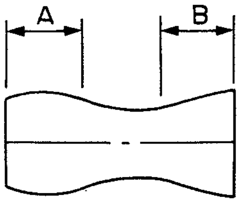


Fig. 5-4-7 Adjustment points

6. After completion of the adjustment(s), turn the tracking control and make sure video envelope variations are almost flat. Next, play back the 3MHz SP mode on the alignment tape (ST-C4) and make sure the video RF envelope variations are also flat when the tracking control is turned.
7. If the envelope varies as shown in Fig. 5-4-8, adjustment is required again.

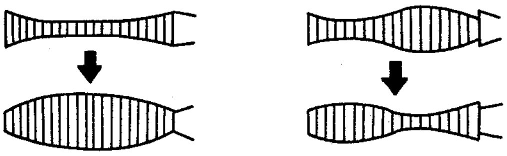


Fig. 5-4-8. Abnormal variation of the waveform

4) ACE head assembly fine adjustment

a. Tape wrinkle check at the lower flange of No. 8 guide

1. Check to see if any wrinkle is observed at the tape between the capstan and the OSC guide. If excessive twist is observed, adjust the OSC guide height until the tape is no longer twisted and perform the adjustment 2.
2. If tape wrinkle is observed at the lower flange of No. 8 guide, adjust the ACE tilt adjusting screw counterclockwise as shown in Fig. 5-4-3 until the wrinkle disappears.
3. If a gap is observed between the lower flange of No. 8 guide and the lower edge of tape, turn the ACE tilt adjusting screw clockwise until the tape travels along the lower flange.

Note:

This adjustment should be made using a beginning part of E-240 tape.

b. Azimuth adjustment

1. Play back the 400Hz, 7kHz audio signal on the alignment tape (ST-C4).
2. Adjust the ACE azimuth adjusting screw for maximum audio output as shown in Fig. 5-4-3.

c. Audio head height adjustment

1. Play back the alignment tape.
2. Adjust the ACE height adjusting nut for maximum audio output.

d. ACE head position adjustment

1. Play back the LP mode 3MHz envelope on the alignment tape (ST-C3).
2. Place the tracking control at its center click position.
3. Trigger the oscilloscope with the video switching pulse and observe the video RF envelope waveform.
4. Turn the taper nut and fix the tape nut at the position where the video envelope reaches a peak level.
5. Play back the SP mode 3MHz video signal on the alignment tape (ST-C4).
6. Make sure the envelope output is maximum when the tracking control is placed at its click position.
   - If no envelope output is obtained with the tracking control set to the center position, again adjust it for maximum envelope output in SP and LP modes.
     (When envelope output is maximum in the LP mode at the tracking center, difference with the case in the SP mode is within 3msec.)
7. Play back the SP mode 400Hz, 7kHz audio signal on the alignment tape ST-C4 and make sure the audio output is maximum.

5) OSC guide lever adjustment

1. Set the VTR to Cue mode with E-240 tape (at beginning portion) loaded. Switch the Cue mode to the review mode when the tape has been rewound into the T-reel table to some extent.
2. Check tape wrinkle at the upper and lower flange of No. 8 guide. Adjust the OSC nut in Fig. 5-4-9 so that the tape runs without tape wrinkle.
3. Set the VTR to the Cue mode again and make sure the tape is not twisted between the capstan and the OSC guide. If twisted, adjust the OSC guide height and the adjustment in step 1 again.

Note:

Previously modify the cassette of E-240 tape for adjusting OSC by removing the lid. First consideration should be given to adjust so that the tape cannot be twisted in the CUE mode.

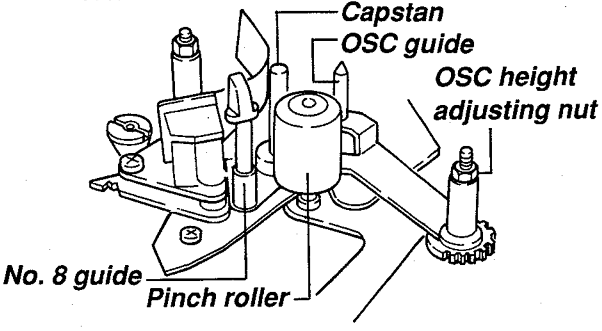


Fig. 5-4-9A OSC guide lever adjustment

6) Check for transitional operation from Review to Play

1. Play back the LP mode 3MHz video signal on the alignment tape ST-C3 in Review mode and observe the video RF envelope with the oscilloscope.
2. Switch the Review mode to the Play mode.
   When switched to the Play mode, make sure the entrance side envelope comes to an approximate steady state within 3 seconds as shown in Fig. 5-4-10.
   If it does not rise within 3 seconds, take the following steps starting 4.
3. Switch the Cassette Slot-In mode to the Play mode. As in item 2., if it does not rise within 3 seconds, adjust as follows.

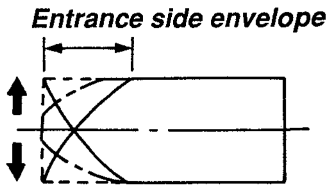


Fig. 5-4-10 Video envelope rising when operation mode is switched from review to play mode.

4. Turn the No. 1 guide nut counterclockwise to adjust the lower flange height. Make sure the tape travels along the lower flange.
5. Since entrance side linearity varies as the height of the lower flange of the No. 1 guide is varied, adjust the S-guide roller to correct the linearity.
6. Check above items 2 and 3 to see that the video envelope rises within 3 seconds. If not, repeat the adjustment from item 4.
7. Make sure no tape wrinkle is observed at the lower flange in the Play mode and the Review mode. If excessive tape wrinkle occurs, perform the adjustment from item 4 until the wrinkle disappears.

Note:

If the rising characteristic is poor in review mode, screen noise may occur in synchronous editing recording.
Perform the adjustment carefully.

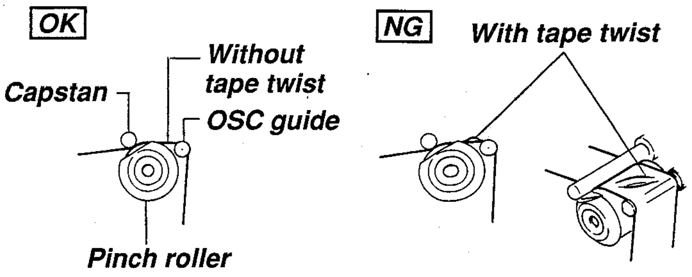
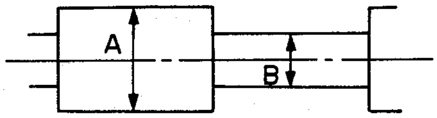


Fig. 5-4-9B Tape twist between Capstan and OSC guide on play & CUE mode

7) Envelope check

1. Make recordings and play back on E-180 and E-240 tapes in SP and LP modes and make sure the playback output envelope meets the specifications shown in Fig. 5-4-6.
2. In playback using the same video deck as used for the recording (with a E-180), the video envelope should meet the specification as shown in Fig. 5-4-11. (Check for both modes, SP and LP.



- *B/A ≧ 0.55*
- *B ≧ 120 mV*

Fig. 5-4-11 Envelope output and output difference

3. If the performance does not meet both specifications above 1 and 2 above, replace the upper cylinder assembly.
4. Set the video to LP mode with the E-180 tape loaded (at the beginning part) and check operation of the synchronous editing recording.
5. If picture noises are observed at the starting position of the editing, again adjust the height of No. 1 guide lower flange.

8) Tape wrinkle check

1. Playback the E-240 tape in the Play mode, CUE mode, Review mode and the frame feeding mode, and check each guide for wrinkle.
2. If excessive tape wrinkle is observed at the mode shown below, perform the associated adjustments also shown below.
   a. Playback mode
      - Tape wrinkle at the S, T-guide rollers section
        Item 3) Linearity adjustment
      - Tape wrinkle at No. 8 guide flange
        Item 1) ACE head assembly coarse adjustment
      - Tape wrinkle at lower flange of No.1 guide
        Item 6) Check for transitional operations from Review to Play, and Slot-In to Play
   b. Review mode
      Tape wrinkle at No. 8 guide
        Item 5) OSC guide lever adjustment, or
        item 1) ACE head assembly coarse adjustment
   c. Frame feeding mode
      Tape wrinkle at No. 8 guide
        Item 3) Linearity adjustment

Note:

In case of adjustment for SP mode only unit, please use SP mode alignment tape (ST-C4) instead of LP mode alignment tape (ST-C3), and adjust finely.

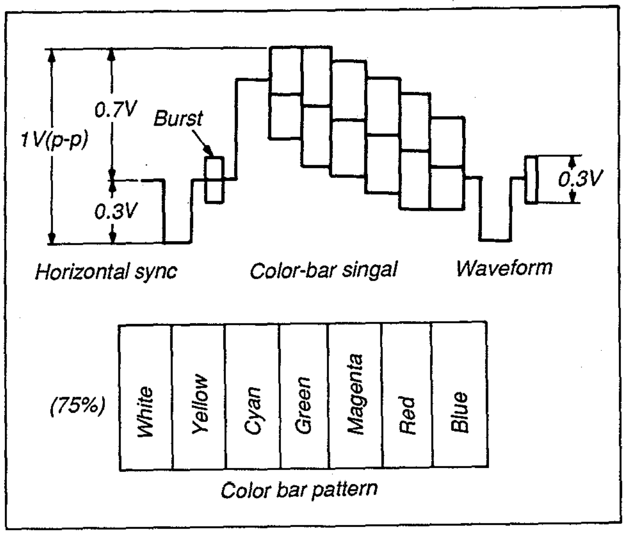
2. ELECTRICAL ADJUSTMENT

<Test equipment required>
Adjustment will be performed with the following test equipment.

1. Color TV (Monitor)
2. Oscilloscope, 2 CHs, 15 MHz or higher with delay system
3. Frequency counter (7 digits or higher)
4. Millivoltmeter
5. Digital voltmeter
6. Tester (20k ohm/V)
7. Audio generator
8. Audio attenuator
9. Alignment tapes
   Part code: ST-C4: 70909302
10. Alignment screw driver (jig)
11. Color pattern generator
12. Video sweep generator

<Color bar signal>

Color bar signals of 75 % recorded on the alignment tapes are shown in Fig. 2-1-1.



1 V(p-p)
0.7V
Burst
0.3V
0.3V
Horizontal sync
Color-bar singal
Waveform
(75%)
White
Yellow
Cyan
Green
Magenta
Red
Blue
Color bar pattern

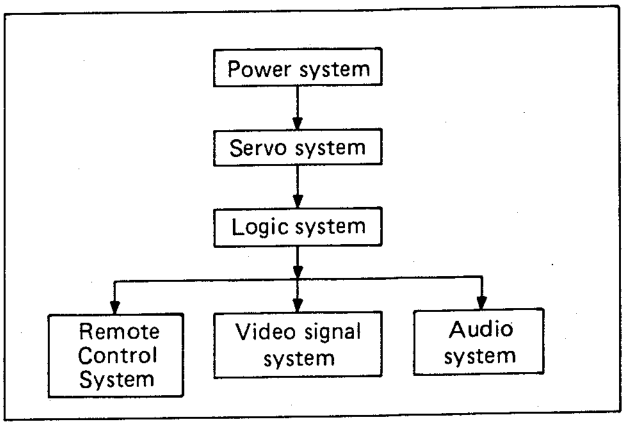
Fig. 2-1-1

<Specified input and output levels, and impedance>

Video input:	Negative sync, standard composite video signal 1 Vp-p, 75 ohm
Video output:	Same as the video input 1 Vp-p, 75 ohm
Audio input:	–3.8 dBm
Audio output:	–3.8 dBm

Alignment sequence

Proceed the alignments in the sequence as shown in Fig. 2-1-2.



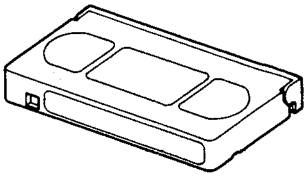


Fig. 2-1-2

Alignment tape specifications

[1] ST-C3

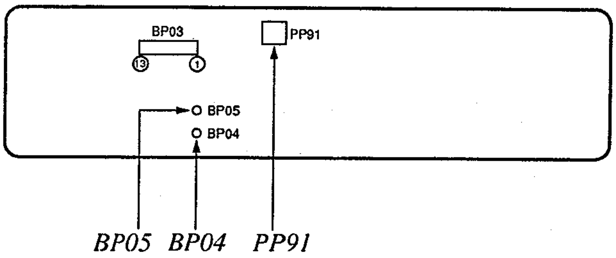
Seg-ment	System	Playback		Video signal	Audio signal	Applications
		Time (min.)	Mode			
1	PAL	5	LP	3 MH Ach	400 Hz	Tape path check and adjustment
2	PAL	3	LP	Color bar	No signal	Video check and adjustment
3	PAL	3	SP	Color bar	AFM 400 Hz	Video and AFM check and adjustment
4	PAL & SECAM	5	SP	3 MHz Ach	AFM 400 Hz	AFM tracking check
5	SECAM	5	LP	3 MHz Ach	No signal	Tape path check and adjustment
6	SECAM	3	LP	Color bar	No signal	Video check and adjustment
7	SECAM	3	SP	Color bar	AFM 400 Hz	Video and AFM check and adjustment

[2] ST-C4

Seg-ment	System	Playback	Video signal	Audio signal	Applications
		Time (min.)			
1	PAL & SECAM	10	Mono Scope	1 kHz	Servo checks and adjustment
2	PAL & SECAM	10	3 MHz Ach	400 Hz & 7 kHz	Tape path checks and adjustment
3	PAL	5	Color bar	3 kHz	Video and Sound checks and adjustment
4	SECAM	5	Color bar	3 kHz	Video and Sound checks and adjustment
5	MESECAM	5	Color bar	3 kHz	Video and Sound checks
6	NTSC	5	Color bar	1 kHz	Video and Sound checks

Note:
With reference to adjustment for audio system, ST-C1 can be used instead of ST-C4.

2-1. Power Supply Circuit


BP03
PP91
⑬
①
BP05
BP04
BP05
BP04
PP91

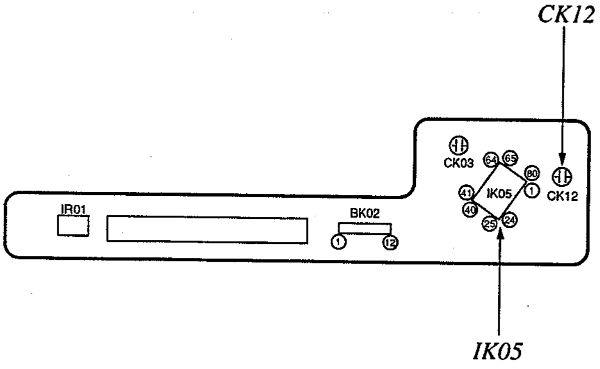
Power PC Baord

2-1-1. 14.2V DC

Test point: BP04, BP05 (GND)
Test equipment: Voltmeter
Adjusting point: PP91

1. Connect a voltmeter to BP04 and BP05.
2. Set the VTR to "Tuner – EE" mode.
3. Adjust PP91 for 14.20V with mains voltage at 220V.

2-2. Timer Circuit


CK12
CK03
IK05
CK12
IR01
BK02
①
⑫
IK05

Timer PC Board

2-2-1. Clock Frequency

Test point: Pin 4 of IK05
Test equipment: Frequency counter
Adjusting point: CK12

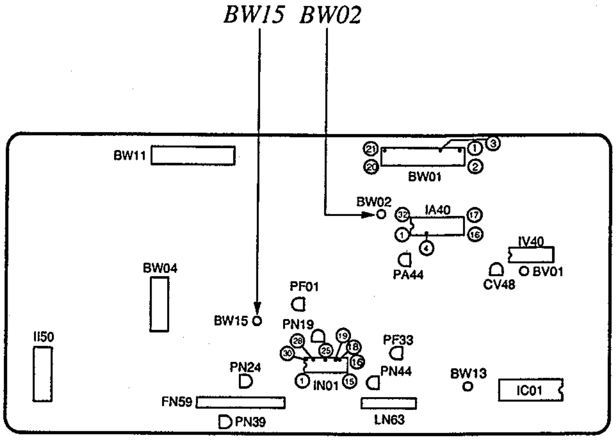
1. Connect an oscilloscope to pin 4 of IK05.

Note:

- Correct adjustment is only possible with high impedance probe 50 : 1 or active probe.
- Probe capacitance must be less than 2.5pF.

2. Adjust CK12 for 8192 ± 0.05 Hz.

2-3. Servo Circuit

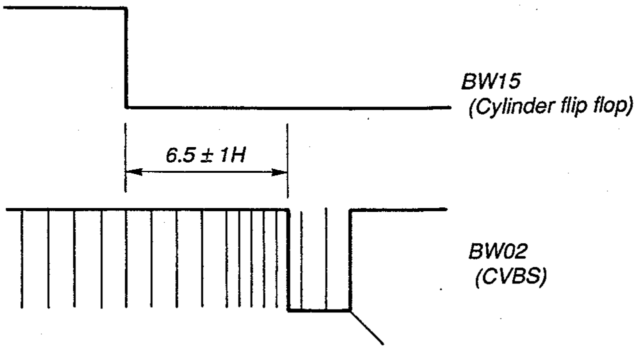

BW15
BW02
BW11
BW01
BW02
IA40
IV40
BV01
CV48
PA44
BW04
PF01
BW15
PN19
II50
PF33
PN24
PN44
BW13
IC01
IN01
FN59
PN39
LN63

Main PC Board

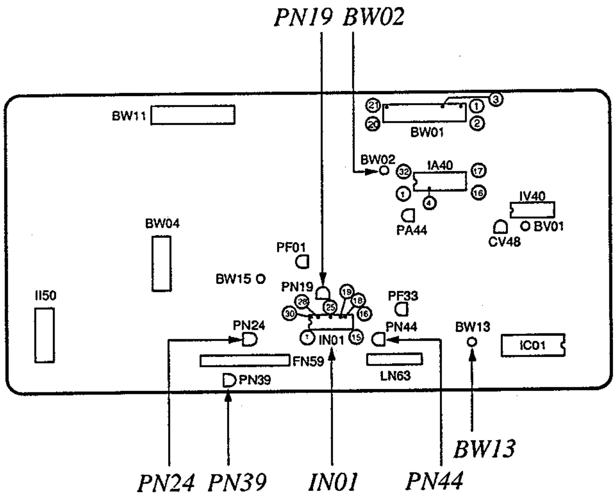
2-3-1. Head Switching Point

Test point: BW02, BW15 (Trigger)
Test equipment: Oscilloscope (dual-trace)
Adjusting point: ————

1. Load the alignment tape (ST-C4) into the VTR.
2. Connect a dual trace oscilloscope to BW02 and BW15.
3. Set the VTR to playback mode.
4. Provide for a quite good tracking adjustment.
5. Press "Play" and "REC" keys at the same time.
6. Press any Mecha function keys.
7. Confirm that head switching point is 6.5 ± 1H before V-sync.


BW15
(Cylinder flip flop)
6.5 ± 1H
BW02
(CVBS)
V-SYNC

2-4. Video Circuit



Main PC Board

2-4-1. EE Level

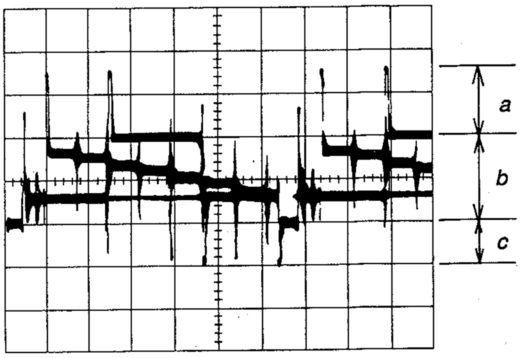
Test point: BW02
Test equipment: Oscilloscope
Adjusting point: PN39

1. Feed the color bar signal (PAL) to the line input terminal and set the VTR to EE mode.
2. Connect an oscilloscope to BW02 and trigger the scope with composite sync signal at BW13.
   Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust PN39 so that amplitude of 2.0 ± 0.1Vp-p is obtained.
4. Confirm that the burst amplitude is 580 ± 40mVp-p.

2-4-2. White Clip, Dark Clip

Test point: Pin 25 of IN01
Test equipment: Oscilloscope
Adjusting point: PN24

1. Feed the PAL color bar signal to the line input terminal and set the VTR to EE mode.
2. Connect an oscilloscope to pin 25 of IN01 and trigger the scope with composite sync signal at BW13.
   Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust PN24 so that overshoot appearing the white peak side shows 90 ± 5% of the Y signal level.
4. Confirm that an undershoot appearing on the sync tip side shows 65 ± 5% of the Y signal level.

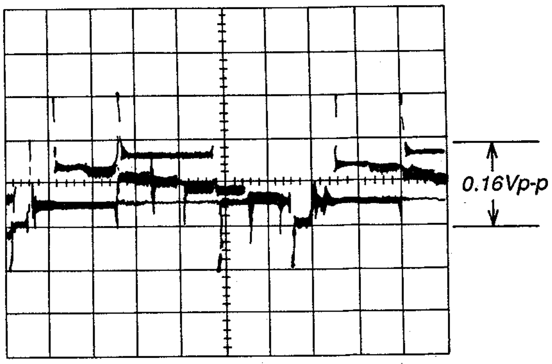


a : b = 100 : 90
a : c = 100 : 65

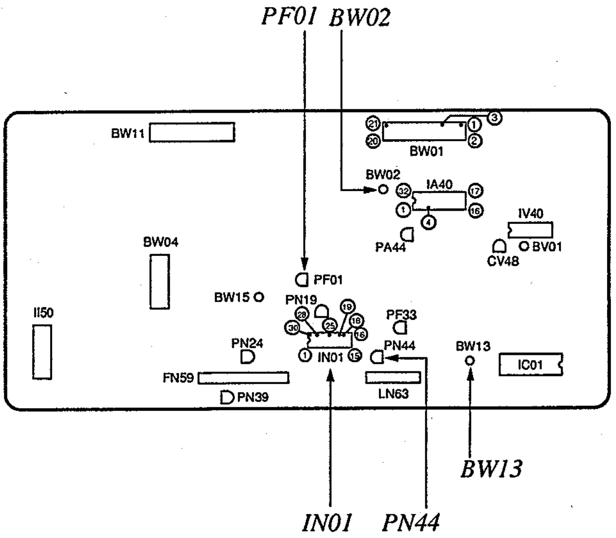
2-4-3. FM Deviation

Test point: Pin 30 of IN01
Test equipment: Oscilloscope
Adjusting point: PN19, PN44

1. Feed the color bar signal (PAL) to the line input terminal.
2. Connect the oscilloscope to pin 30 of IN01 and trigger the scope with a HD pulse at BW13. Adjust the scope so that a waveform is displayed for approx 2H period.
3. Adjust PN19 to obtain the amplitude of approx. 0.16Vp-p between the sync tip and the white peak.
   After adjusting PN44 (Playback Y signal output level) with the method 2-4-6, repeat above adjustment procedures, and then adjust PN19 (FM deviation control) so that the playback Y signal output level at PN44 shows 2.0 ± 0.15Vp-p.



Horizontal axis: 10ms/div.
Vertical axis: 0.05V/div.



Main PC Board

2-4-4. REC FM Current

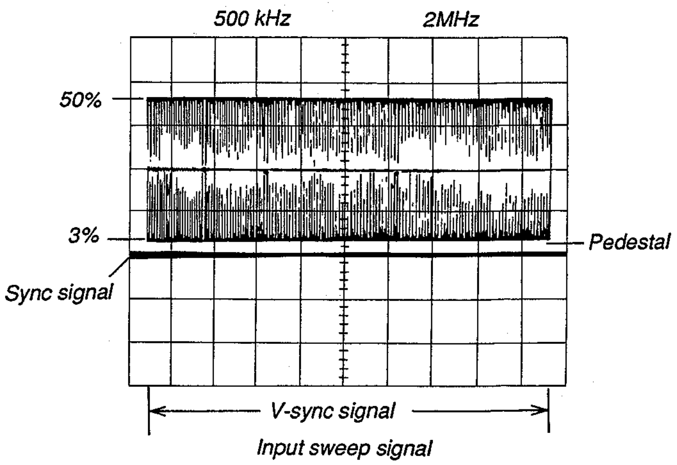
Test point: TF41 emitter
Test equipment: Oscilloscope
Adjusting point: PF41

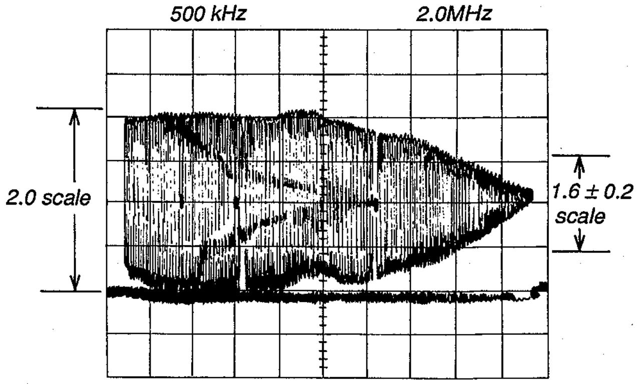
1. Feed the PAL color bar signal to the line input terminal and set the VTR to REC mode.
2. Connect the oscilloscope to TF41 emitter and trigger the scope with composite sync signal at BW13. Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust PF41 so that the amplitude of "Black level" portion shows 640 ± 50 mVp-p.

2-4-5. Picture Sharpness Preset

Test point: Pin 28 of IN01
Test equipment: Oscilloscope
Adjusting point: PF01

1. Record and playback a video sweep signal fed to the line input terminals.
2. Connect the oscilloscope to pin 28 of IN01 and trigger the scope with a signal at BW13. Adjust the scope so that a waveform is displayed for more than 1V (vertical sync) period.
3. Adjust PF01 so that relative amplitude at 2MHz shows 1.6 ± 0.2 (scale), where amplitude at 500 kHz is assumed as "A" (A = 2 scale).



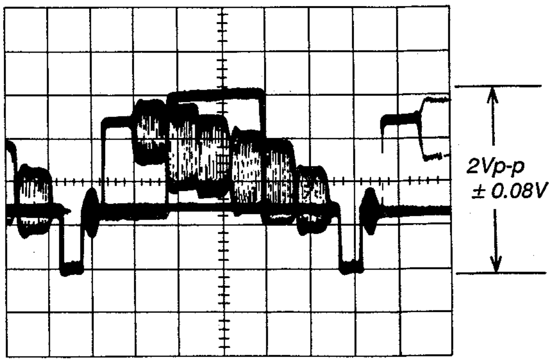


Playback waveform of pin 28 of IN01

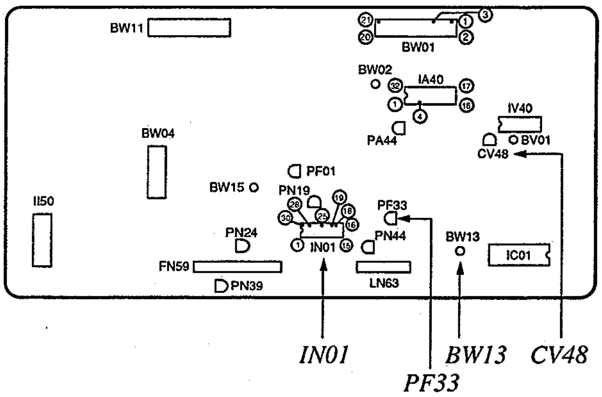
2-4-6. Playback Y Signal Output Level

Test point: BW02
Test equipment: Oscilloscope
Adjusting point: PN44

1. Playback the alignment tape (PAL color bar signal).
2. Connect the oscilloscope to BW02 and trigger the scope with composite sync signal at BW13. Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust PN44 so that amplitude of 2.0 ± 0.08Vp-p is obtained.



Horiizontal axis: 10 μs/div.
Vertical axis: 0.05V/div.

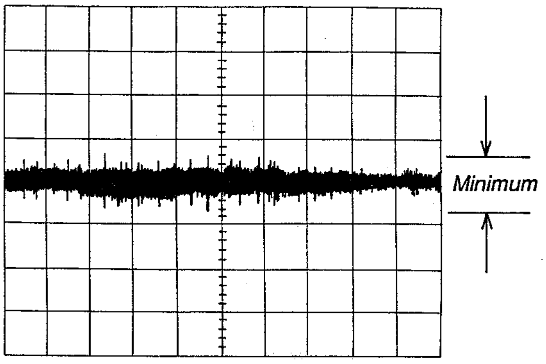

BW11
BW01
21
20
1
2
3
BW02
IA40
32
17
1
16
4
IV40
PA44
BV01
CV48
BW04
PF01
BW15
PN19
28
19
25
18
30
16
PF33
I150
PN24
PN44
BW13
1
IN01
15
IC01
FN59
LN63
PN39
IN01
BW13
CV48
PF33

Main PC Board

2-4-7. Y Comb-filter Balance

Test point: TP204, Pin 18 and 19 of IN01
Test equipment: Oscilloscope
Adjusting point: PF33

1. Play back the alignment tape (PAL color bar signal).
2. Connect the oscilloscope (CH-1) to pin 18 of IN01 and (CH-2) to pin 19 of IN01, and trigger the scope with HD pulse at BW13.
   Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust the scope so that amplitude gain for each channel is the same.
4. Set polarity of the CH-2 to the negative (INV) mode.
5. Set the scope to ADD mode which adds signals in the CH-1 and CH-2.
   Adjust PF33 so that amplitude on the scope display shows minimum. (Ignore glitches.)



2-4-8. 4.43 MHz VXO

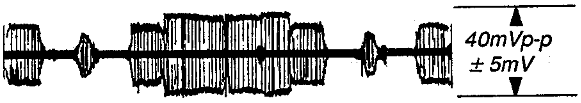
Test point: BV01
Test equipment: Frequency counter
Adjusting point: CV48

1. Playback the alignment tape (PAL color bar signal).
2. Connect a frequency counter to BV01.
3. Adjust CV48 for 4.433619 MHz ± 10 Hz.

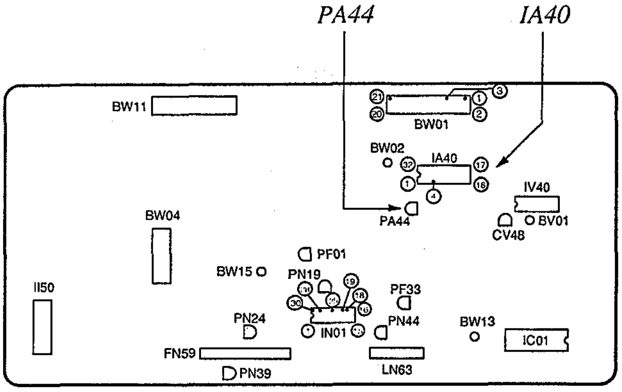
2-4-9. Color Record Current

Test point: TV45 emitter
Test equipment: Oscilloscope
Adjusting point: PV57

1. Feed the PAL color bar sinal to the line input terminals and set the VTR to the REC mode.
2. Connect the oscilloscope to TV45 emitter and trigger the scope with HD pulse at BW13. Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust PV57 so that amplitude of the red portion shows 40 mVp-p ± 5mV.



2-5. OSD Circuit

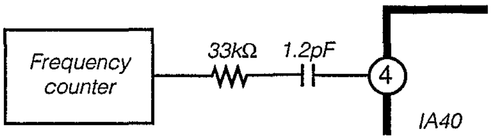

PA44
IA40
BW11
BW01
BW02
IA40
IV40
BW04
PA44
BV01
CV48
PF01
BW15
PN19
PF33
II50
PN24
PN44
BW13
IN01
IC01
FN59
PN39
LN63

Main PC Board

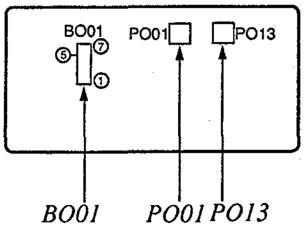
2-5-1. Character Oscillator

Test point: Pin 4 of IA40
Test equipment: Frequency counter
Adjusting point: PA44

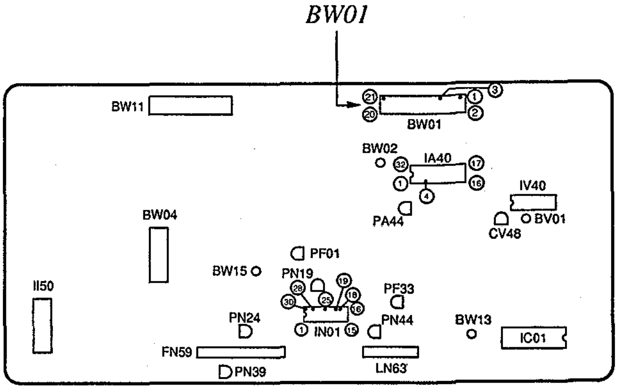
1. Connect a frequency counter via a R/C series circuit (R = 33 kΩ, C = 1.2 pF) at pin 4 of IA40.
2. Adjust PA44 for 7.6 MHz ± 40 kHz.


Frequency counter
33kΩ
1.2pF
4
IA40

2-6. Audio Circuit


BO01
PO01
PO13
BO01
PO01
PO13

Audio PC Board


BW01
BW11
BW01
BW02
IA40
IV40
BW04
PA44
BV01
CV48
PF01
BW15
PN19
PF33
II50
PN24
PN44
BW13
IN01
IC01
FN59
PN39
LN63

Main PC Board

2-6-1. Audio Bias Level

Test point: Pin 5 of BO01
Test equipment: Oscilloscope
Adjusting point: PO01

1. Set the VTR to REC mode without singal.
2. Connect an oscilloscope to pin 5 of BO01.
3. Adjust PO01 so that the amplitude of 40 ± 15 Vp-p is obtained.

2-6-2. Playback level

Test point: Pin 1 and 3 of BW01
Test equipment: Oscilloscope
Adjusting point: PO13

1. Playback the alignment tape (1 kHz).
2. Connect an oscilloscope to pin 1 (pin 3) of BW01.
3. Adjust PO13 so that the amplitude of 1.4 ± 0.2 Vp-p.

This page is not printed.

SECTION 3
SERVICING DIAGRAMS

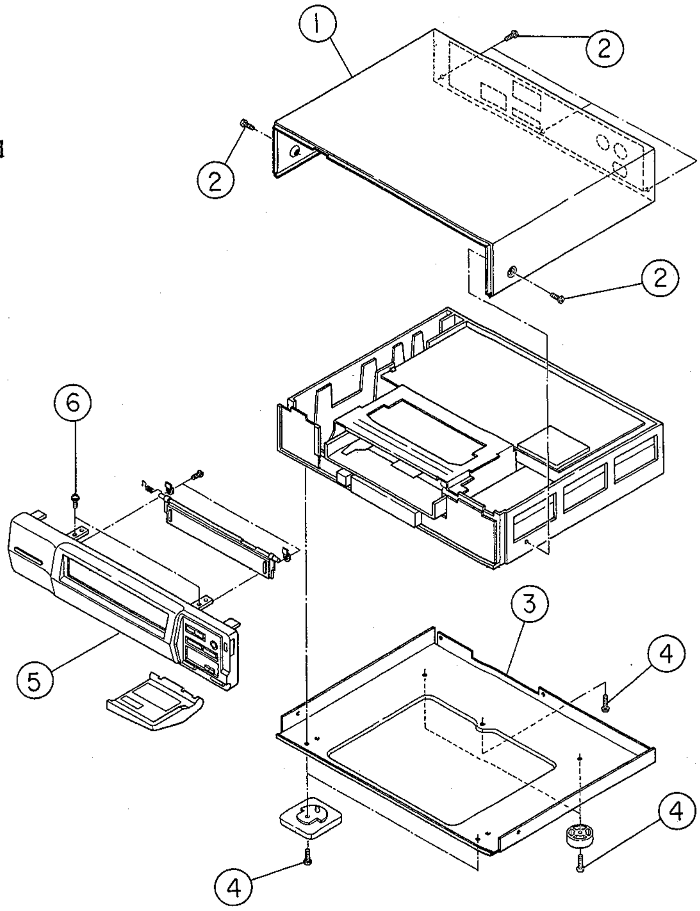
1. Inspection Procedure

Operation steps		Items to be confirmed	Inspection block	Page	
				Block Diagram	Circuit Diagram
1. AC Plug-in	Time setting Program timer setting	Clock display Time setting operation	Power (AC system) Key display	3-11	3-17 3-19
2. Power SW ON	Power ON, SP/LP, Counter Channel selection, AFC operation, EE picture & tone quality	Mode display lamp TV receive condition, Channel select operation, AFC operation level, EE picture quality, Tone signal level	Power Logic RF reception Video (EE, REC mode) Audio (EE, REC mode)	3-12 3-14	3-17 3-21 3-25 3-25 3-23
3. Cassette-in and Cassette-out	Cassette-in Cassette loading Eject Cassette-out	F/L mecha. operation Cassette loading operation Eject operation Indicator lamp Abnormal sound	Logic	3-12	3-21
4. Key entry operation Remote control	REC, PLAY Cue/Review Still, Frame feeding/slow FF/REW	Indicator lamp Each mode operation (Tape drive operation) Abnormal sound	Logic Remote Control	3-12	3-21 3-31
5. Special Functions					
Fully Automatic Play	Cassette-in at Power OFF (Without safety tab)	Power ON, Cassette down Automatic Play	Power Logic	3-12	3-17 3-21
GO-TO function	Selecting a target point	Winding the tape to a desired point	Logic/Servo	3-12	3-21
VISS	Indoor search	Locating the desired program using the index signal registered on the tape			
Tracking	Digital tracking	Automatical adjustment for the tracking			
Picture	PNR	Reducing the playback noise	Video, Logic	3-12,14	3-21,25
Auto Repeat playback	Set the VTR to Auto repeat mode.	Repeat playback from the beginning to the end of a tape 10 times.			
6. Playback Function Picture Sharpness Tone Quality Others	PLAY (Test tape: ST-C4) Cue/Review Still/Slow	Resolution, S/N Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter Picture swing, Skew distortion, Flicker, Beat	Video PLAY system Audio PLAY system Servo system	3-14 3-12	3-25 3-23 3-21
7. REC/PLAY Functions Picture Sharpness Tone Quality Others	REC/PLAY	Resolution, S/N Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter Picture swing, Skew distortion, Flicker, Beat	Video PLAY system Audio PLAY system Servo system	3-14 3-12	3-25 3-23 3-21

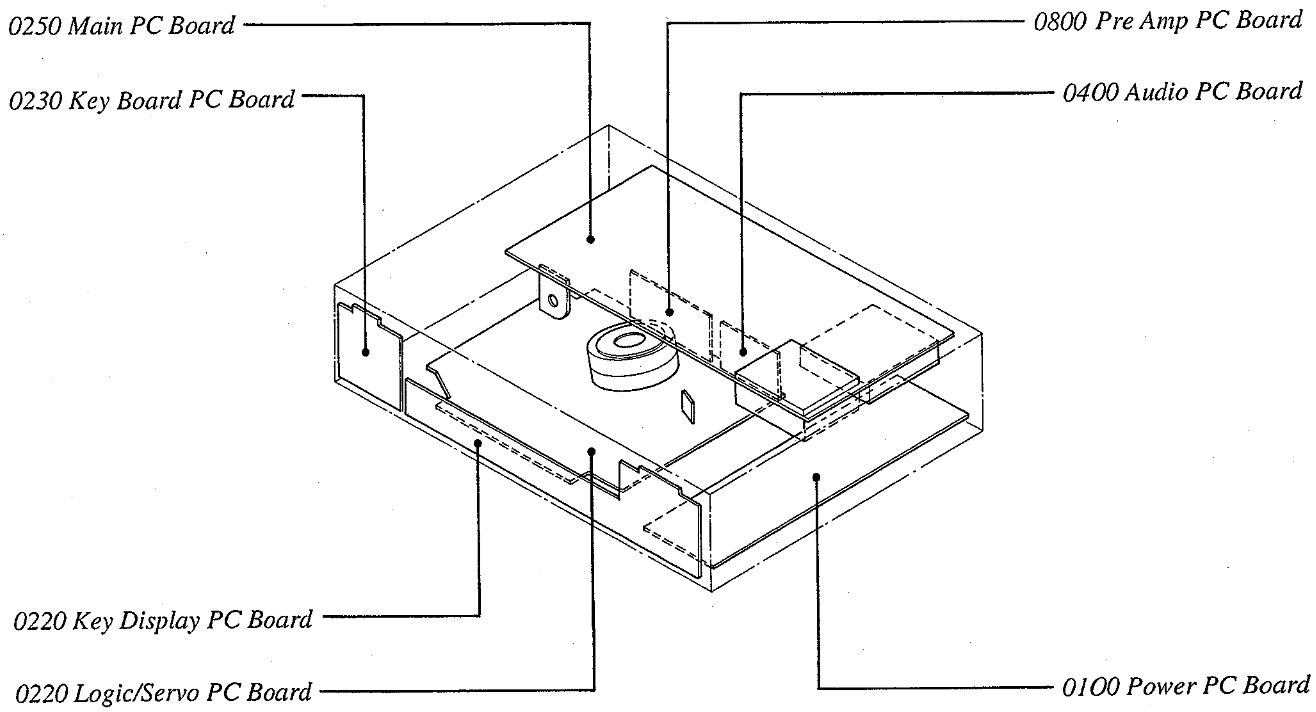
How to use the table
1. When inspecting a defective VTR, proceed according to the steps shown in the table.
2. Check the items to be confirmed for each operation step.
3. If a problem is found on the item, check waveforms (level) referring to the block diagram relating to the items.
4. Use PC board pattern diagram and schematic diagram to examine the circuit precisely.
5. After completion of the repair work, check steps 1 - 7 again.

2. Removal of Cabinet

1. Disconnect the power cord plug from the AC outlet.
2. Remove 5 screws ② securing the top cover ①.
3. Slide the top cover ① backward to remove.
4. Remove 5 screws ④ securing the bottom cover ③, and then remove the bottom cover ③.
5. Remove the two screws ⑥ securing the front panel ⑤.
6. Remove the front panel ⑤.

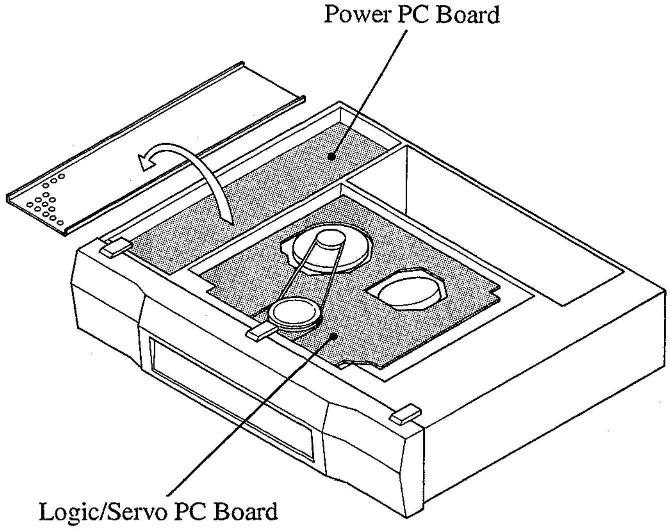

①
②
②
②
⑥
③
④
⑤
④
④

3. Electrical Units Location Diagram

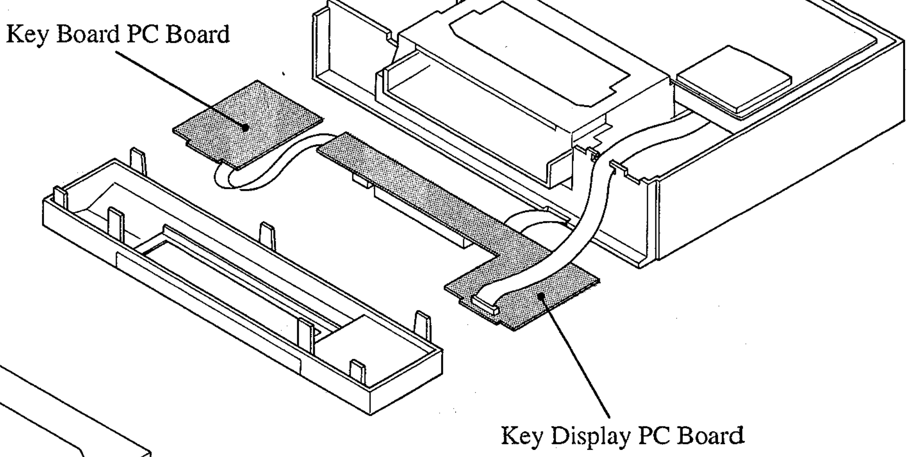

0250 Main PC Board
0800 Pre Amp PC Board
0230 Key Board PC Board
0400 Audio PC Board
0220 Key Display PC Board
0220 Logic/Servo PC Board
0100 Power PC Board

4. Standing PC Boards for Servicing

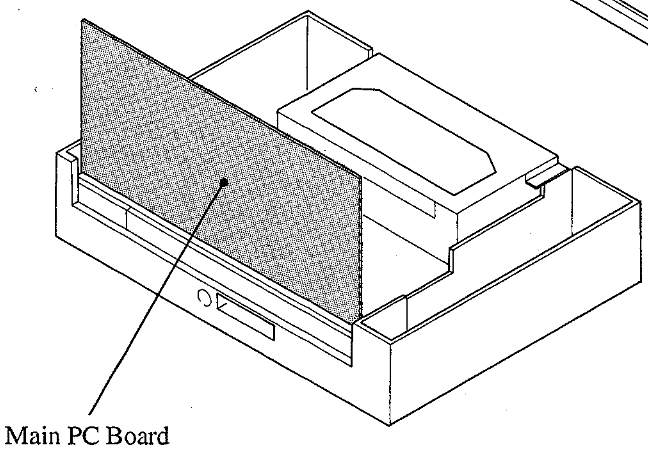
Power, Logic/Servo PC Board


Power PC Board
Logic/Servo PC Board

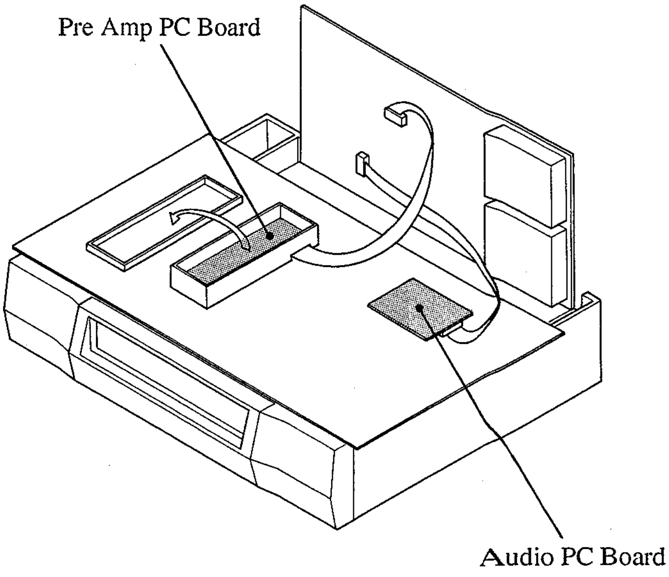
Key Display, Key Board PC Board


Key Board PC Board
Key Display PC Board

Main PC Board


Main PC Board

Pre Amp, Audio PC Board


Pre Amp PC Board
Audio PC Board

5. Part Configuration and their Symbols

1. ICs

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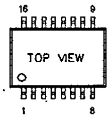
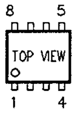
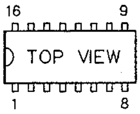
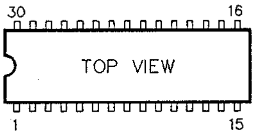
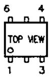
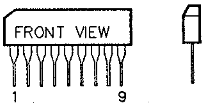
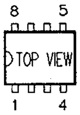
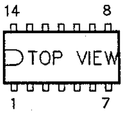
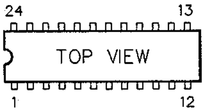
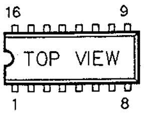
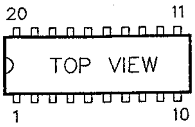
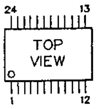
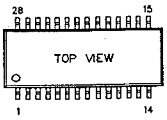
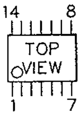
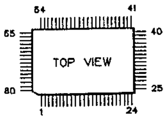
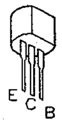
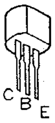
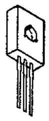
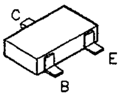
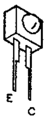
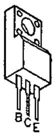
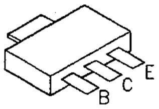
HEF4053BT MC14094BD HEF4052BT U2559B	 16 9 TOP VIEW 1 8
IR-9106-K TC89101P MSM7401RS	 8 5 TOP VIEW 1 4
TDA5930	 16 9 TOP VIEW 1 8
AN3248NK	 30 16 TOP VIEW 1 15
TDA8128	 6 4 TOP VIEW 1 3
LA7051	 FRONT VIEW 1 9
BA7046	 8 5 TOP VIEW 1 4
TBA120T	 14 8 TOP VIEW 1 7
TA8757	 24 13 TOP VIEW 1 12

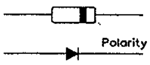
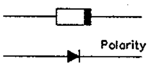
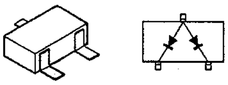
NAME	SHAPE
M50558-117S	 16 9 TOP VIEW 1 8
L2726 U2565B	 20 11 TOP VIEW 1 10
LA7282M	 24 13 TOP VIEW 1 12
TEA5706	 28 15 TOP VIEW 1 14
74HC00 74HC14 74HC74	 14 8 TOP VIEW 1 7
ST90T30-QFP80	 64 41 65 40 TOP VIEW 80 25 1 24

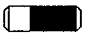
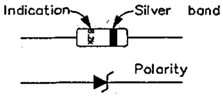
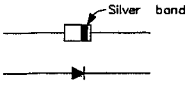
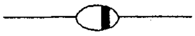
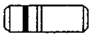
2. TRANSISTORs

BC369 MPS750	
BC337 BC548B BC327	

NAME	SHAPE
BD435 BD434	
BC848B,BCX19,BC847B BC817,BC847,RN2404 BC858,BC807 BC857,BC848 BC858,BF799 BC848,BC857B	
PT493F	
TE02499F	
BCP53 BCP69 PZT222	

3. DIODEs

1N4148 ZPD10V ZPD6.2 ZPD10 1N4007 1N4148	
1N4001	
1SS181	

NAME	SHAPE
LL4148 3216	
BA157 1N5822	 Indication Silver band Polarity
6V8	 Silver band
BYV28-150 MUR115 BA158	
ZMM2.7 ZMM7.5 ZMM9.1	

PRECAUTIONS FOR PART REPLACEMENT

* In the schematic diagram, parts marked ⚠ (ex. ⚠ F801) are critical part to meet the safety regulations, so always use the parts bearing specified part codes (SN) when replacing them.

* Using the parts other than those specified shall violate the regulations, and may cause troubles such as operation failures, fire, etc.

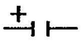
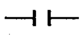
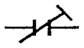
SOLID RESISTOR INDICATION

Resistor	**1/6W film**	**P type film**	**U type film**	**Solid**	**Oxide film**	**Metal film**	**Cement**	**Fuse**
Symbol	None	P	U	S	R	W	W	RF

Tolerance	**±2%**	**±5%**	**±10%**	**±20%**
Symbol	G	J	None	None

* All film type and oxide film resistors are ±5%, so the tolerance symbol was not indicated for them.

CAPACITANCE INDICATION

Description	**Symbol**	**Capacitance, unit**	**Capacitance allowance**
Electrolytic		μF	Not indicated
Special electrolytic			Indicated
Plastic film		μF: indicated with numbers below decimal point	Indicated below ±5% (J), indicated below ±0.5pF, not indicated for others
Ceramic		pF: indicated with numbers over decimal point	
Trimmer		pF	Not indicated

Note: No working voltage is indicated for capacitors rated at 50V except electrolytic capacitors.

WAVEFORM AND VOLTAGE MEASUREMENT

* Measurement of waveform and voltage at each section in the color circuits was conducted with sufficient service color bar signal being received and reproduced in normal conditions.

* Waveforms and voltage values for the remaining circuit were measured with a broadcasting signal normally received, so they may vary slightly according to the programs being received. Use them as a measure for servicing.

* All voltage values except the waveforms are expressed in DC and measured by a digital voltmeter.

CHIP PART REPLACEMENT

(Use spare part with wire leads connected.)

1. Hold a Chip part to be removed with tweezers and apply heat to the solder at one end of the part with a soldering iron. (Fig. 1)
2. Apply heat to the solder at the other end of the part and remove it.
   The heating time should be as short as possible so the excessive heat is not applied to foil patterns and the PC Board.
3. If it is difficult to remove the part, temporarily stop the desoldering job and wait until temperature of the part lowers.
   Then, repeat steps 1 and 2.
4. Form leads of the replacement part (general part equivalent to the chip part) as shown in the figures and solder place. (Fig. 2)
5. Mount the replacement part so that it does not touch any other parts. (Fig. 3)

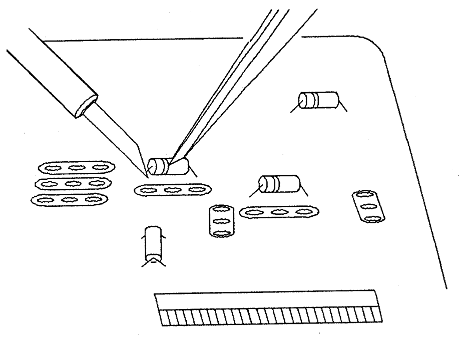


Fig. 1

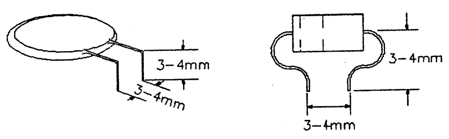


Fig. 2

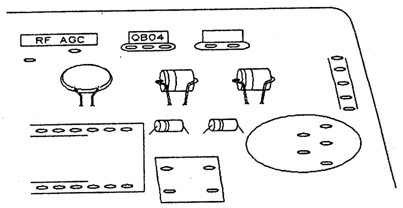


Fig. 3

REPLACING SUBMINIATURE "CHIP" PARTS

1) Required tools:

1. Fine tipped, well insulated soldering "pencil", about 30 Watts.
2. Tweezers
3. Blower type hair dryer.

2) Soldering cautions:

1. Do not apply heat for more than 3 seconds.
2. Avoid using a rubbing stroke when soldering.
3. Discard removed chips; do no reuse them.
4. Supplementary cementing is not required.
5. Use care not to scratch or otherwise damage the chips.

3) Removal (resistors, capacitors, etc.):

1. Melt the solder at one side.

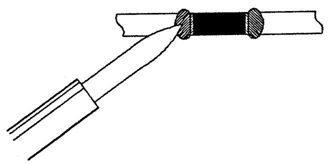


Fig. 1

2. Grasp the part with tweezers and melt the solder at the other side.

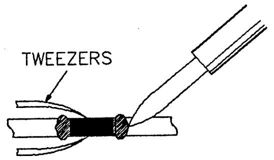


Fig. 2

3. Remove the part with a twisting motion.

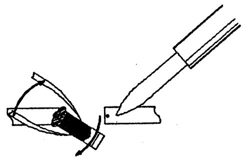


Fig. 3

4) Removal (transistors, diodes, etc.):

1. Melt the solder of one lead.

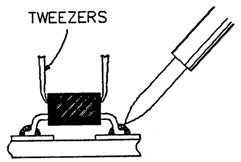


Fig. 4

2. Lift the side of that lead upward.

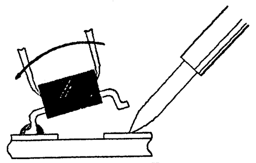


Fig. 5

3. Simultaneously heat solder the two remaining leads and lift part to remove.

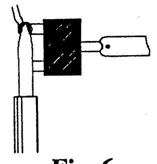


Fig. 6

5) Preheating (except for semiconductors):
Immediately before installing new resistors or capacitors, use a blower type hair dryer and preheat the part for about two minutes at approximately 150°C.

6) Replacement:

1. Presolder the contact points of the circuit pattern.

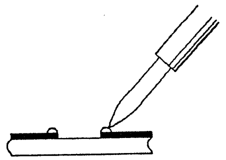


Fig. 7

2. Press the part downward with tweezers and apply the soldering pencil as indicated in the figure.

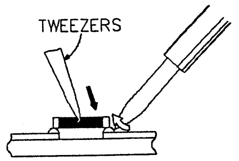
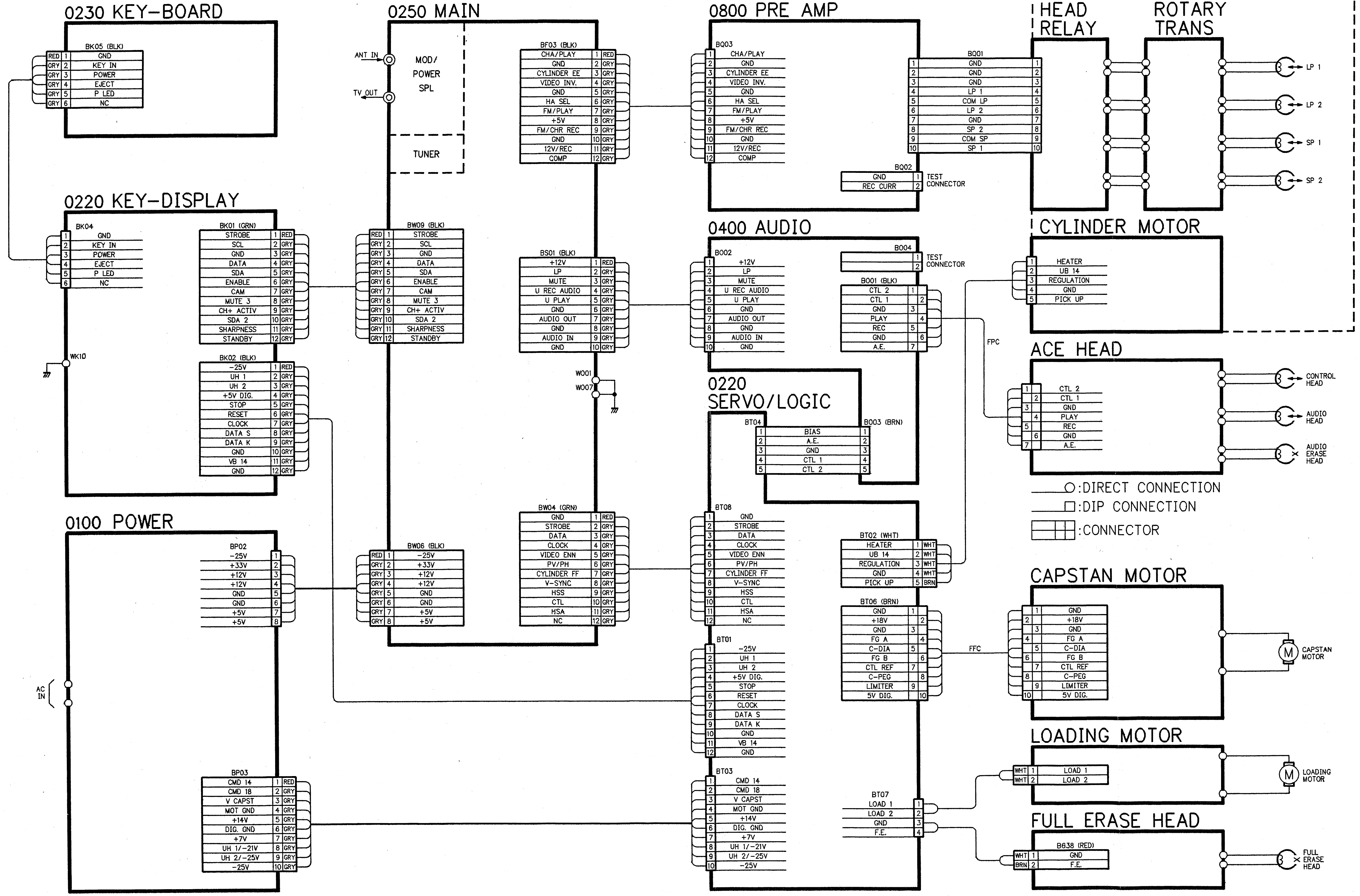


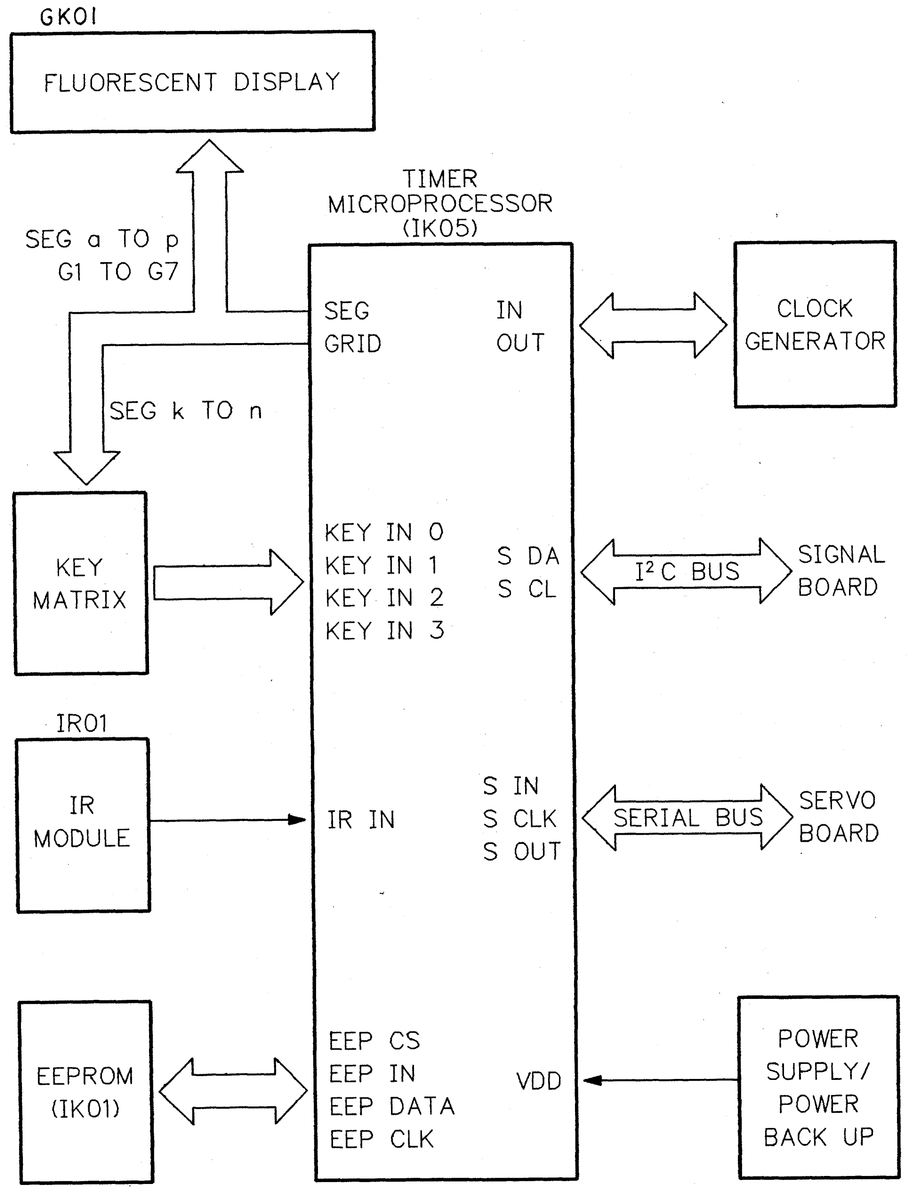
Fig. 8

6. Printed Wiring Board and Schematic Diagram

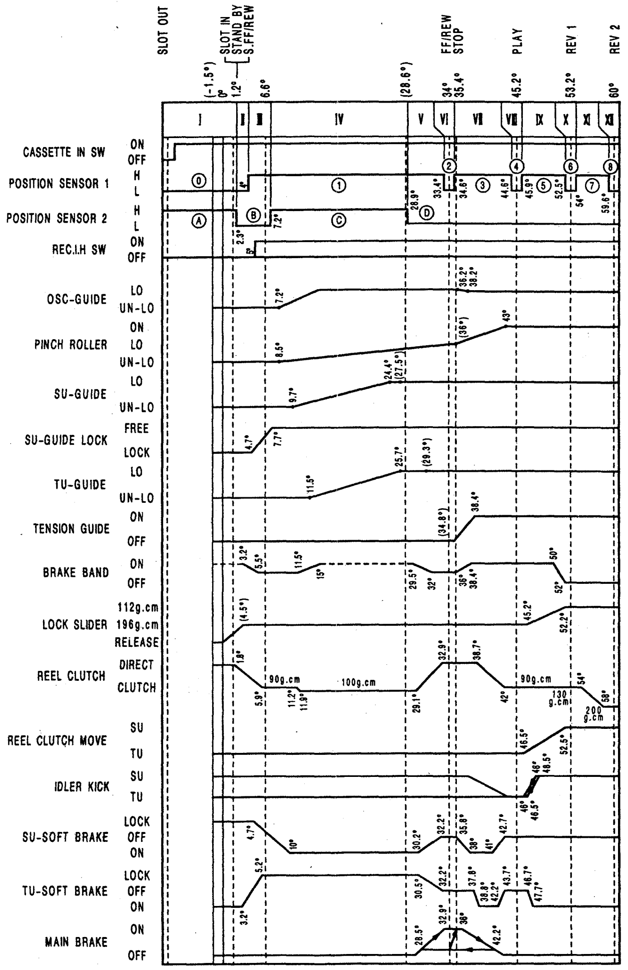

0230 KEY-BOARD
BK05 (BLK)
GND
KEY IN
POWER
EJECT
P LED
NC
0250 MAIN
ANT IN
TV OUT
MOD/ POWER SPL
TUNER
BF03 (BLK)
CHA/PLAY
GND
CYLINDER EE
VIDEO INV.
GND
HA SEL
FM/PLAY
+5V
FM/CHR REC
GND
12V/REC
COMP
0800 PRE AMP
BQ03
BQ01
LP 1
COM LP
LP 2
SP 2
COM SP
SP 1
BQ02
REC CURR
TEST CONNECTOR
HEAD RELAY
ROTARY TRANS
LP 1
LP 2
SP 1
SP 2
0220 KEY-DISPLAY
BK04
BK01 (GRN)
STROBE
SCL
DATA
SDA
ENABLE
CAM
MUTE 3
CH+ ACTIV
SDA 2
SHARPNESS
STANDBY
BK02 (BLK)
-25V
UH 1
UH 2
+5V DIG.
STOP
RESET
CLOCK
DATA S
DATA K
VB 14
WK10
BW09 (BLK)
BS01 (BLK)
+12V
LP
MUTE
U REC AUDIO
U PLAY
AUDIO OUT
AUDIO IN
W001
W007
0400 AUDIO
B002
B004
B001 (BLK)
CTL 2
CTL 1
PLAY
REC
A.E.
CYLINDER MOTOR
HEATER
UB 14
REGULATION
PICK UP
FPC
ACE HEAD
CONTROL HEAD
AUDIO HEAD
AUDIO ERASE HEAD
0220 SERVO/LOGIC
BT04
B003 (BRN)
BIAS
O:DIRECT CONNECTION
□:DIP CONNECTION
:CONNECTOR
BW04 (GRN)
VIDEO ENN
PV/PH
CYLINDER FF
V-SYNC
HSS
CTL
HSA
NC
BT08
BT02 (WHT)
BT06 (BRN)
+18V
FG A
C-DIA
FG B
CTL REF
C-PEG
LIMITER
5V DIG.
FFC
CAPSTAN MOTOR
0100 POWER
BP02
+33V
+12V
+5V
BW06 (BLK)
AC IN
BT01
BT03
BP03
CMD 14
CMD 18
V CAPST
MOT GND
+14V
DIG. GND
+7V
UH 1/-21V
UH 2/-25V
BT07
LOAD 1
LOAD 2
F.E.
LOADING MOTOR
FULL ERASE HEAD
B638 (RED)
RED
GRY
WHT
BRN

7. Block Diagrams

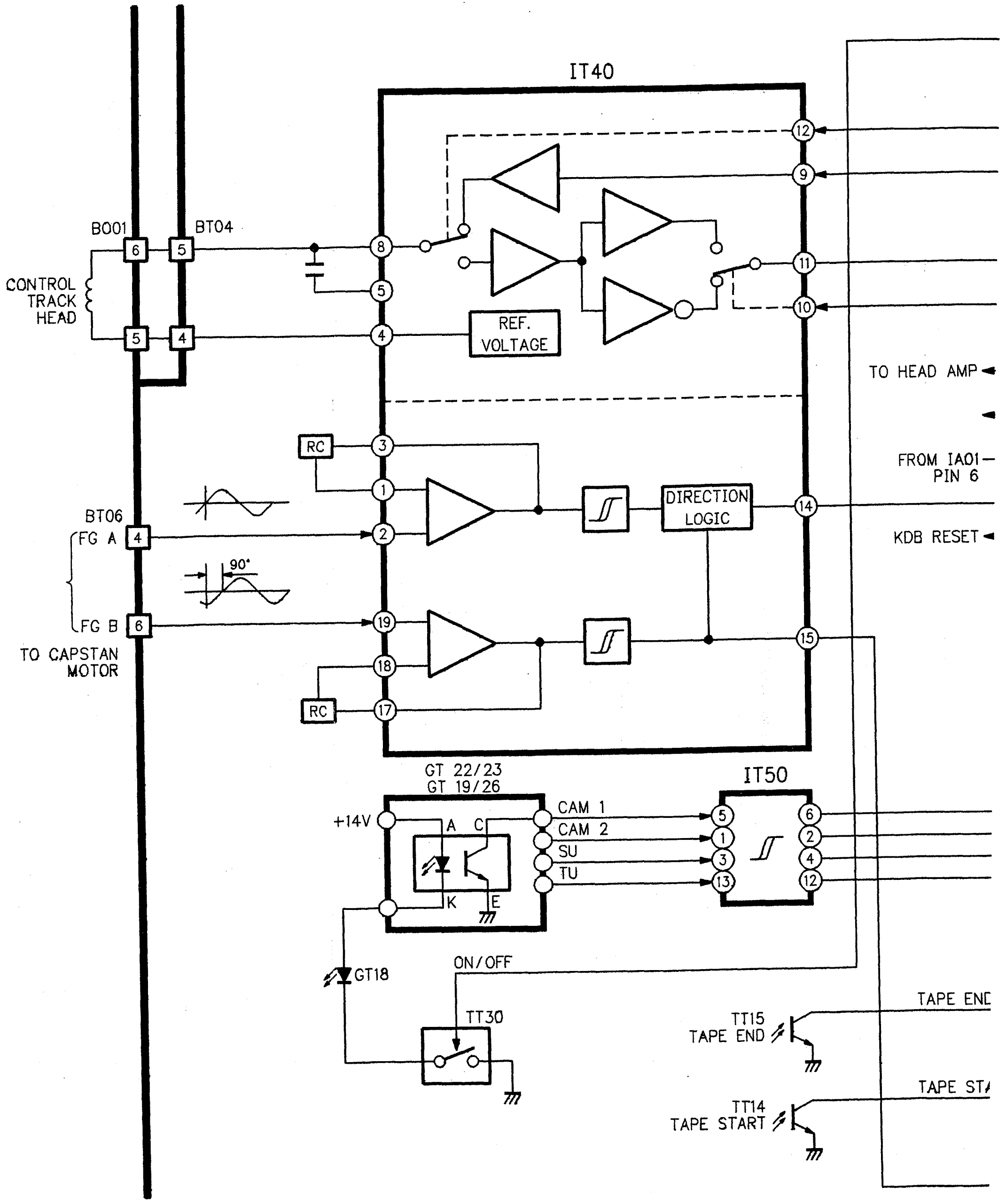
7-1. Key Display Block Diagram


GK01
FLUORESCENT DISPLAY
SEG a TO p
G1 TO G7
SEG k TO n
TIMER MICROPROCESSOR (IK05)
SEG
GRID
IN
OUT
CLOCK GENERATOR
KEY MATRIX
KEY IN 0
KEY IN 1
KEY IN 2
KEY IN 3
S DA
S CL
I²C BUS
SIGNAL BOARD
IR01
IR MODULE
IR IN
S IN
S CLK
S OUT
SERIAL BUS
SERVO BOARD
EEPROM (IK01)
EEP CS
EEP IN
EEP DATA
EEP CLK
VDD
POWER SUPPLY/ POWER BACK UP

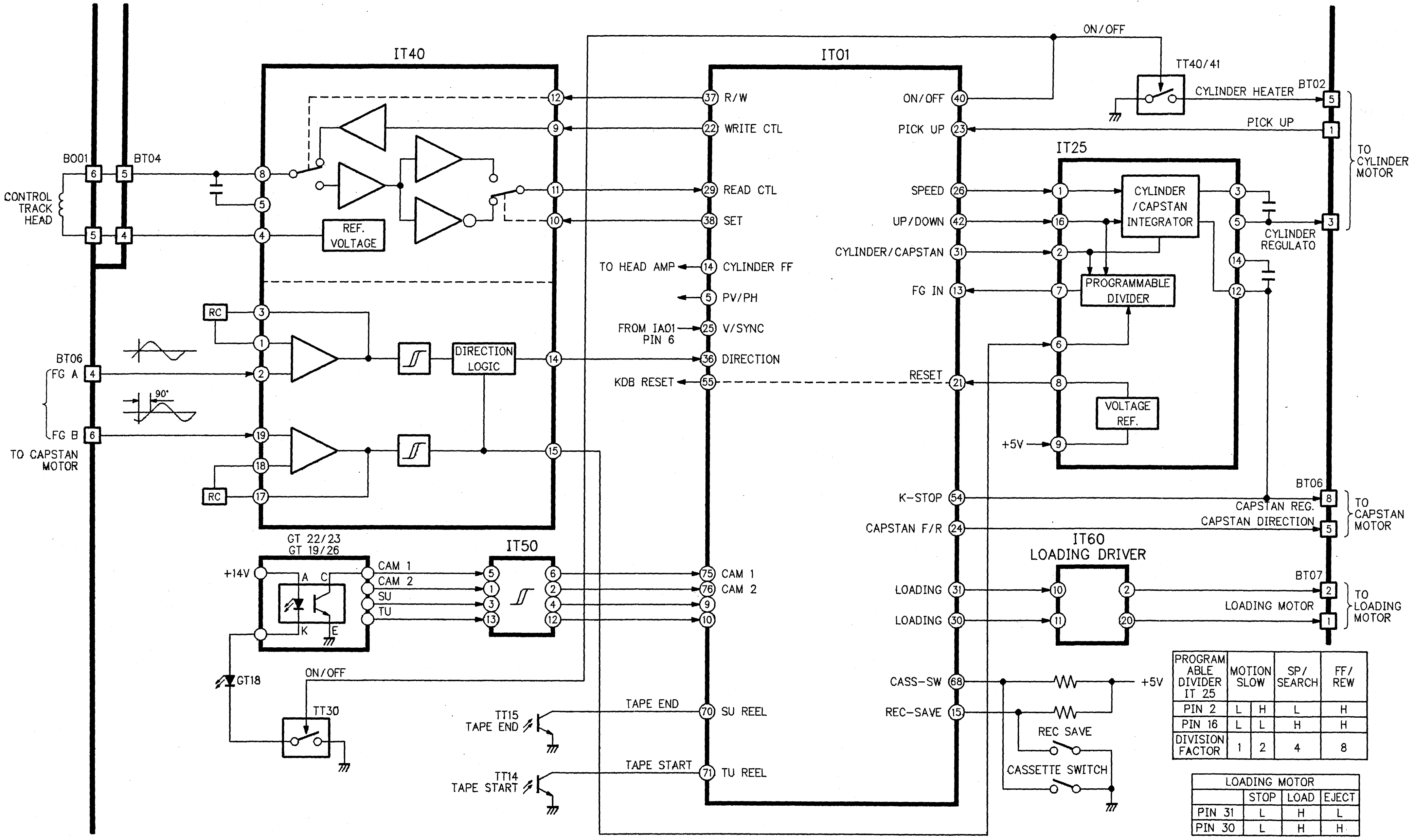
7-2. Logic/Servo Block Diagram



Cam Timing Chart

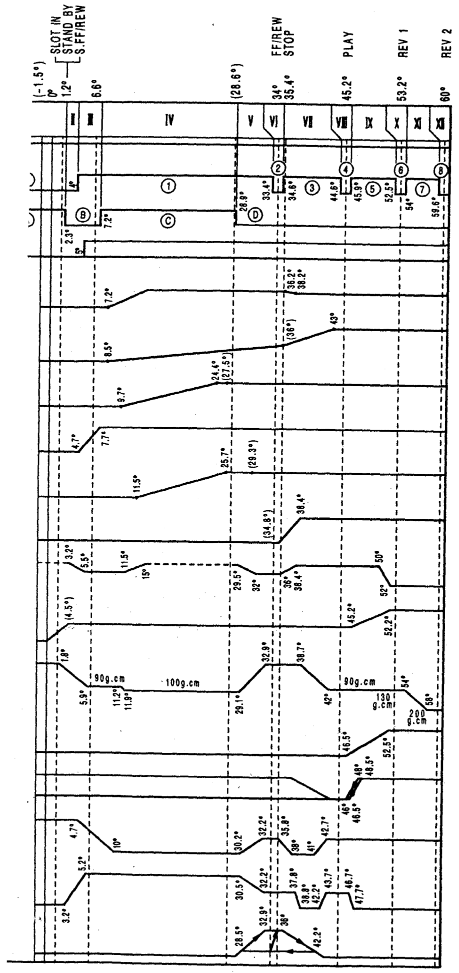

IT40
B001
BT04
CONTROL TRACK HEAD
REF. VOLTAGE
TO HEAD AMP
FROM IA01-PIN 6
RC
DIRECTION LOGIC
KDB RESET
BT06
FG A
FG B
90°
TO CAPSTAN MOTOR
GT 22/23
GT 19/26
+14V
A
C
K
E
CAM 1
CAM 2
SU
TU
IT50
GT18
ON/OFF
TT30
TT15
TAPE END
TT14
TAPE START
TAPE END
TAPE ST

Block Diagram


IT40
IT01
IT25
IT50
IT60
LOADING DRIVER
BO01
BT04
CONTROL TRACK HEAD
REF. VOLTAGE
RC
DIRECTION LOGIC
BT06
FG A
FG B
TO CAPSTAN MOTOR
90°
GT 22/23
GT 19/26
+14V
CAM 1
CAM 2
SU
TU
GT18
ON/OFF
TT30
TT15 TAPE END
TT14 TAPE START
TAPE END
TAPE START
R/W
WRITE CTL
READ CTL
SET
TO HEAD AMP
CYLINDER FF
PV/PH
FROM IA01 PIN 6
V/SYNC
DIRECTION
KDB RESET
SU REEL
TU REEL
ON/OFF
PICK UP
SPEED
UP/DOWN
CYLINDER/CAPSTAN
FG IN
RESET
+5V
K-STOP
CAPSTAN F/R
LOADING
CASS-SW
REC-SAVE
REC SAVE
CASSETTE SWITCH
CYLINDER /CAPSTAN INTEGRATOR
PROGRAMMABLE DIVIDER
VOLTAGE REF.
CYLINDER REGULATO
TT40/41
CYLINDER HEATER
BT02
TO CYLINDER MOTOR
BT06
CAPSTAN REG.
CAPSTAN DIRECTION
TO CAPSTAN MOTOR
BT07
LOADING MOTOR
TO LOADING MOTOR

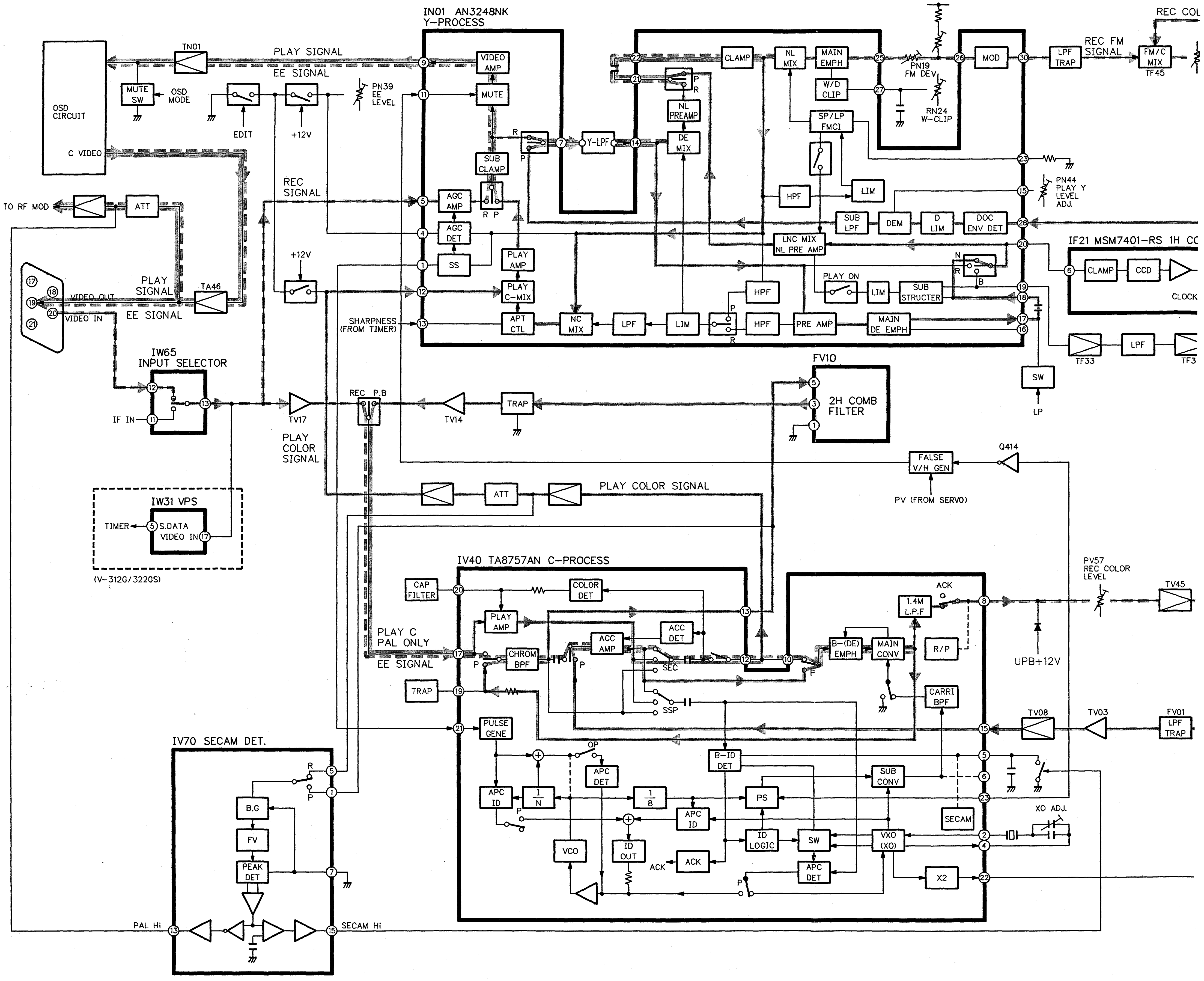
PROGRAMABLE DIVIDER IT 25	MOTION SLOW	SP/ SEARCH	FF/ REW
PIN 2	L	H	L	H
PIN 16	L	L	H	H
DIVISION FACTOR	1	2	4	8

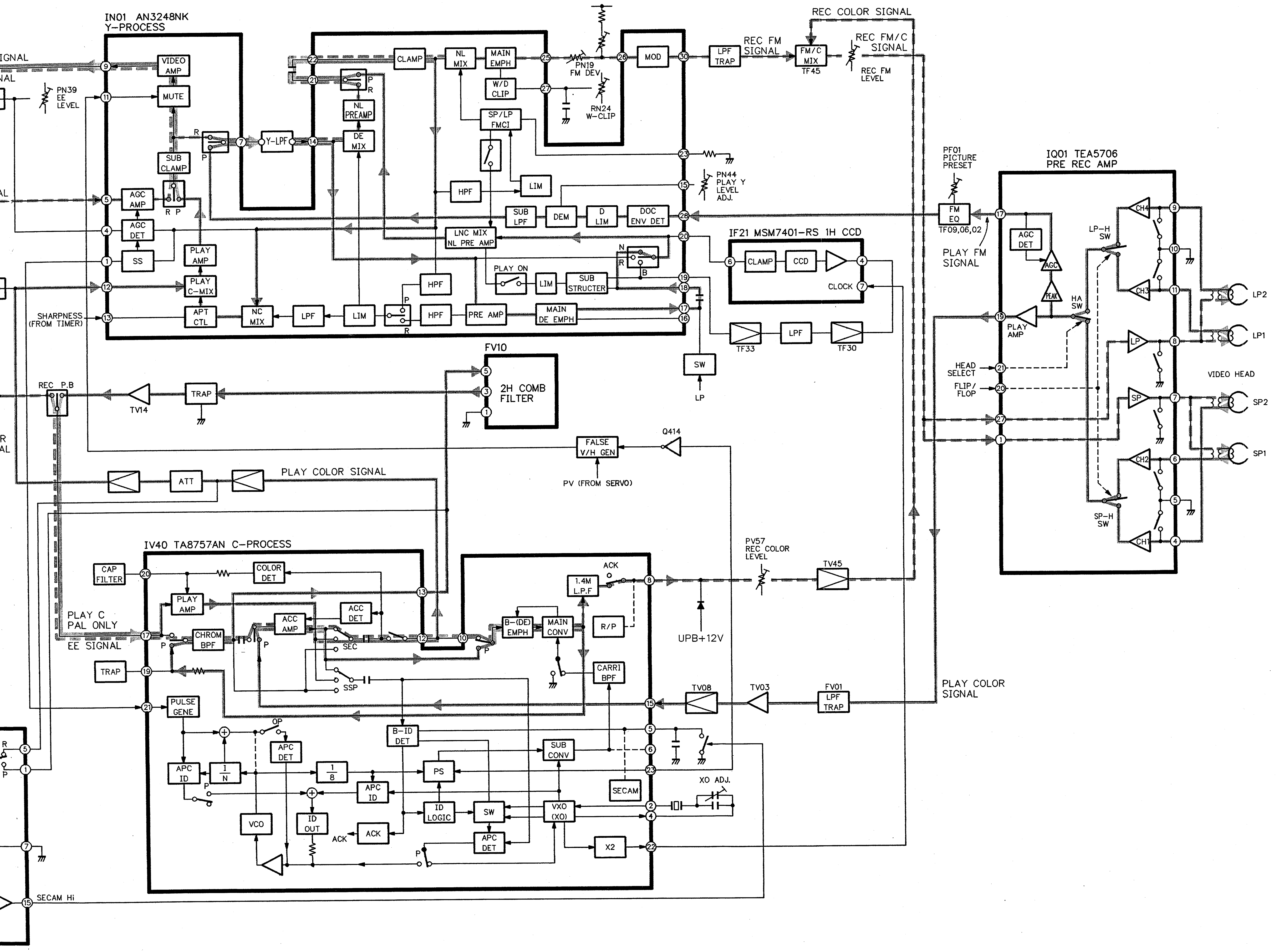
LOADING MOTOR			
	STOP	LOAD	EJECT
PIN 31	L	H	L
PIN 30	L	H	H



Cam Timing Chart

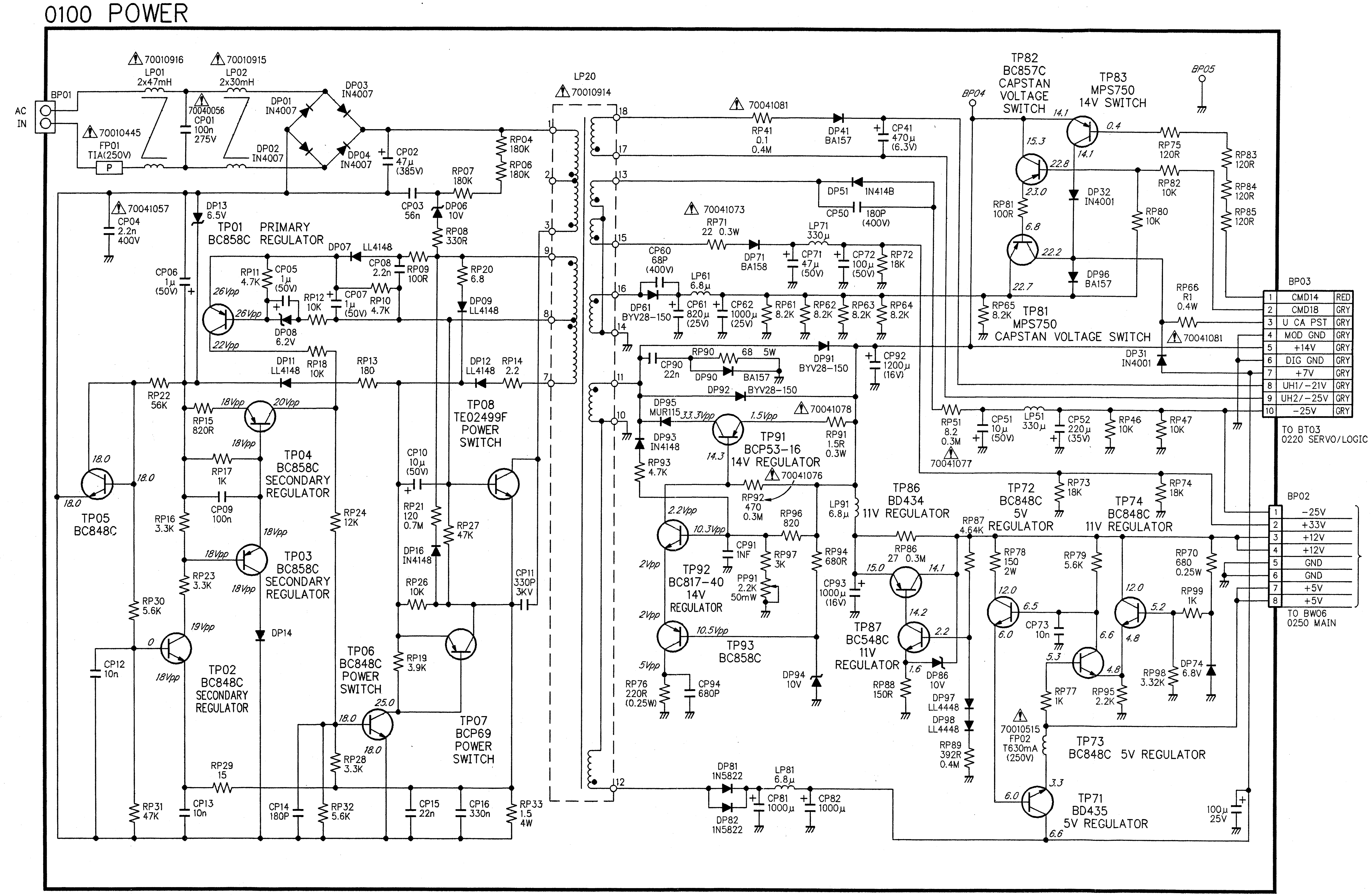
7-3. Video Block Diagram


IN01 AN3248NK
Y-PROCESS
TN01
PLAY SIGNAL
EE SIGNAL
OSD CIRCUIT
C VIDEO
MUTE SW
OSD MODE
EDIT
+12V
PN39 EE LEVEL
VIDEO AMP
MUTE
SUB CLAMP
AGC AMP
AGC DET
SS
PLAY AMP
PLAY C-MIX
APT CTL
NC MIX
LPF
LIM
HPF
PRE AMP
MAIN DE EMPH
Y-LPF
DE MIX
NL PREAMP
CLAMP
NL MIX
MAIN EMPH
W/D CLIP
SP/LP FMCI
PN19 FM DEV
RN24 W-CLIP
MOD
LPF TRAP
REC FM SIGNAL
FM/C MIX
TF45
REC COL
PN44 PLAY Y LEVEL ADJ.
LIM
SUB LPF
DEM
D LIM
DOC ENV DET
LNC MIX NL PRE AMP
PLAY ON
SUB STRUCTER
IF21 MSM7401-RS 1H CC
CCD
CLOCK
TF33
TF3
SW
LP
REC SIGNAL
TO RF MOD
ATT
PLAY SIGNAL
TA46
VIDEO OUT
VIDEO IN
EE SIGNAL
SHARPNESS (FROM TIMER)
IW65 INPUT SELECTOR
IF IN
TV17
REC P.B
TV14
TRAP
FV10
2H COMB FILTER
PLAY COLOR SIGNAL
FALSE V/H GEN
Q414
PV (FROM SERVO)
IW31 VPS
TIMER
S.DATA
VIDEO IN
(V-312G/322GS)
IV40 TA8757AN C-PROCESS
CAP FILTER
COLOR DET
PLAY AMP
ACC AMP
ACC DET
PLAY C PAL ONLY
EE SIGNAL
CHROM BPF
SEC
SSP
TRAP
PULSE GENE
1.4M L.P.F
ACK
B-(DE) EMPH
MAIN CONV
R/P
CARRI BPF
PV57 REC COLOR LEVEL
TV45
UPB+12V
TV08
TV03
FV01 LPF TRAP
IV70 SECAM DET.
B.G
FV
PEAK DET
PAL Hi
SECAM Hi
APC ID
1/N
OP
APC DET
1/8
APC ID
VCO
ID OUT
ACK
B-ID DET
PS
ID LOGIC
SW
APC DET
SUB CONV
SECAM
VXO (XO)
X2
XO ADJ.


IN01 AN3248NK
Y-PROCESS
VIDEO AMP
MUTE
PN39 EE LEVEL
SUB CLAMP
AGC AMP
AGC DET
SS
PLAY AMP
PLAY C-MIX
APT CTL
NC MIX
SHARPNESS (FROM TIMER)
Y-LPF
CLAMP
NL MIX
MAIN EMPH
W/D CLIP
NL PREAMP
DE MIX
SP/LP FMCI
HPF
LIM
SUB LPF
DEM
D LIM
DOC ENV DET
LNC MIX NL PRE AMP
PLAY ON
SUB STRUCTER
PRE AMP
MAIN DE EMPH
LPF
PN19 FM DEV
RN24 W-CLIP
MOD
PN44 PLAY Y LEVEL ADJ.
LPF TRAP
REC FM SIGNAL
REC COLOR SIGNAL
FM/C MIX
TF45
REC FM/C SIGNAL
REC FM LEVEL
IF21 MSM7401-RS 1H CCD
CCD
CLOCK
TF33
TF30
SW
LP
FV10
2H COMB FILTER
REC P.B
TV14
TRAP
Q414
FALSE V/H GEN
PV (FROM SERVO)
ATT
PLAY COLOR SIGNAL
IV40 TA8757AN C-PROCESS
CAP FILTER
COLOR DET
PLAY AMP
ACC DET
ACC AMP
PLAY C PAL ONLY
EE SIGNAL
CHROM BPF
SEC
SSP
B-(DE) EMPH
MAIN CONV
1.4M L.P.F
ACK
R/P
CARRI BPF
PULSE GENE
APC ID
1/N
OP
APC DET
1/8
B-ID DET
SUB CONV
PS
APC ID
ID LOGIC
SW
VXO (XO)
VCO
ID OUT
ACK
APC DET
X2
SECAM
XO ADJ.
SECAM Hi
PV57 REC COLOR LEVEL
TV45
UPB+12V
TV08
TV03
FV01 LPF TRAP
PLAY COLOR SIGNAL
PF01 PICTURE PRESET
FM EQ
TF09,06,02
PLAY FM SIGNAL
IQ01 TEA5706
PRE REC AMP
AGC
PEAK
LP-H SW
HA SW
PLAY AMP
HEAD SELECT
FLIP/FLOP
SP-H SW
CH4
CH3
CH2
CH1
LP
SP
VIDEO HEAD
LP2
LP1
SP2
SP1

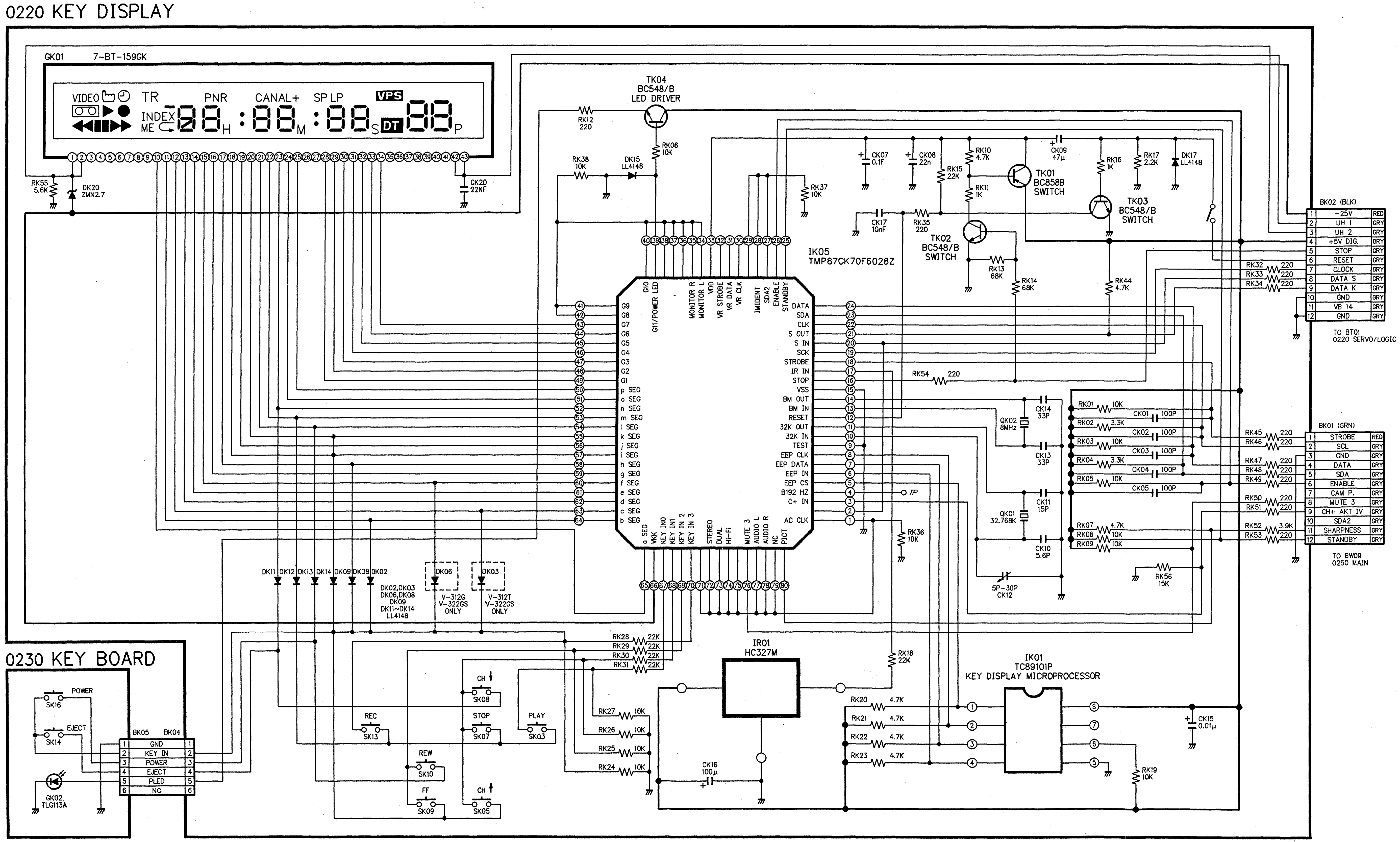
8. Circuit Diagrams

8-1. Power Supply Circuit Diagram

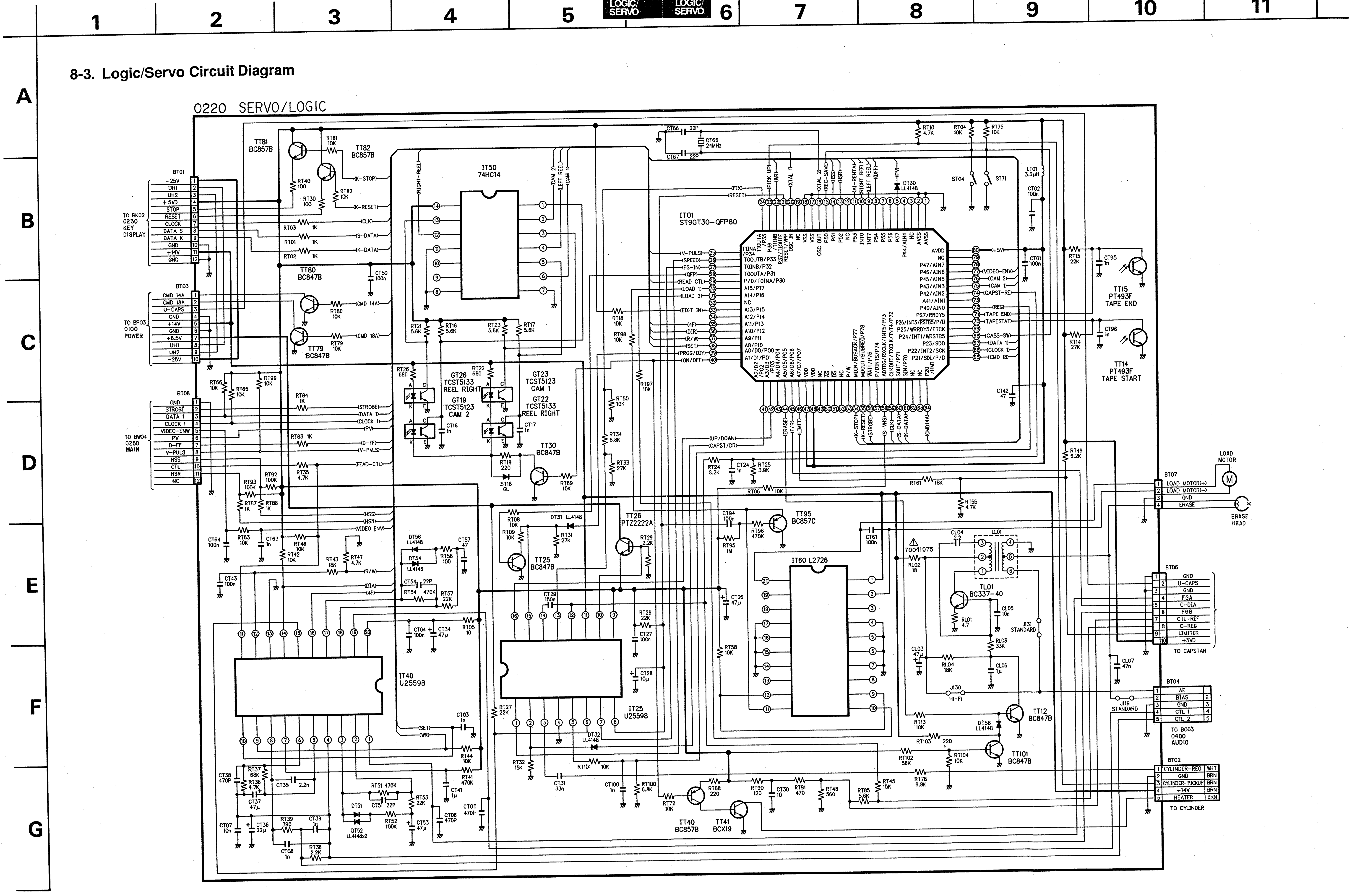


0100 POWER
A
B
C
D
E
F
G
AC IN
BP01
70010916 LP01 2x47mH
70010915 LP02 2x30mH
70010445 FP01 TIA(250V) P
70040056 CP01 100n 275V
DP01 IN4007
DP02 IN4007
DP03 IN4007
DP04 IN4007
CP02 47µ (385V)
RP04 180K
RP06 180K
RP07 180K
CP03 56n
DP06 10V
RP08 330R
70041057 CP04 2.2n 400V
DP13 6.5V
TP01 BC858C PRIMARY REGULATOR
DP07 LL4148
CP05 1µ (50V)
RP11 4.7K
CP08 2.2n
RP09 100R
RP20 6.8
CP06 1µ (50V)
RP12 10K
CP07 1µ (50V)
RP10 4.7K
DP09 LL4148
DP08 6.2V
26Vpp
22Vpp
DP11 LL4148
RP18 10K
RP13 180
DP12 LL4148
RP14 2.2
RP22 56K
RP15 820R
18Vpp
20Vpp
TP08 TE02499F POWER SWITCH
TP04 BC858C SECONDARY REGULATOR
RP17 1K
CP09 100n
CP10 10µ (50V)
RP21 120 0.7M
RP27 47K
DP16 IN4148
RP26 10K
CP11 330P 3KV
18.0
TP05 BC848C
RP16 3.3K
RP24 12K
TP03 BC858C SECONDARY REGULATOR
RP23 3.3K
RP30 5.6K
DP14
19Vpp
TP02 BC848C SECONDARY REGULATOR
CP12 10n
TP06 BC848C POWER SWITCH
RP19 3.9K
25.0
TP07 BCP69 POWER SWITCH
RP28 3.3K
RP29 15
RP31 47K
CP13 10n
CP14 180P
RP32 5.6K
CP15 22n
CP16 330n
RP33 1.5 4W
LP20 70010914
70041081 RP41 0.1 0.4M
DP41 BA157
CP41 470µ (6.3V)
DP51 IN414B
CP50 180P (400V)
70041073 RP71 22 0.3W
DP71 BA158
LP71 330µ
CP71 47µ (50V)
CP72 100µ (50V)
RP72 18K
CP60 68P (400V)
LP61 6.8µ
DP61 BYV28-150
CP61 820µ (25V)
CP62 1000µ (25V)
RP61 8.2K
RP62 8.2K
RP63 8.2K
RP64 8.2K
RP90 68 5W
CP90 22n
DP90 BA157
DP91 BYV28-150
CP92 1200µ (16V)
DP92 BYV28-150
DP95 MUR115
DP93 IN4148
RP93 4.7K
70041078
TP91 BCP53-16 14V REGULATOR
RP91 1.5R 0.3W
70041076
RP92 470 0.3M
RP96 820
LP91 6.8µ
CP91 1NF
RP97 3K
PP91 2.2K 50mW
TP92 BC817-40 14V REGULATOR
TP93 BC858C
RP94 680R
CP93 1000µ (16V)
DP94 10V
RP76 220R (0.25W)
CP94 680P
DP81 1N5822
DP82 1N5822
LP81 6.8µ
CP81 1000µ
CP82 1000µ
TP82 BC857C CAPSTAN VOLTAGE SWITCH
TP83 MPS750 14V SWITCH
BP04
BP05
RP75 120R
RP82 10K
RP83 120R
RP84 120R
RP85 120R
RP81 100R
DP32 IN4001
RP80 10K
DP96 BA157
RP65 8.2K
TP81 MPS750 CAPSTAN VOLTAGE SWITCH
RP66 R1 0.4W
70041081
DP31 IN4001
RP51 8.2 0.3M
70041077
CP51 10µ (50V)
LP51 330µ
CP52 220µ (35V)
RP46 10K
RP47 10K
TP86 BD434 11V REGULATOR
RP87 4.64K
RP86 27 0.3M
TP87 BC548C 11V REGULATOR
DP86 10V
RP88 150R
DP97 LL4448
DP98 LL4448
RP89 392R 0.4M
TP72 BC848C 5V REGULATOR
RP73 18K
RP78 150 2W
RP79 5.6K
CP73 10n
TP74 BC848C 11V REGULATOR
RP74 18K
RP70 680 0.25W
RP99 1K
DP74 6.8V
RP98 3.32K
RP77 1K
RP95 2.2K
70010515 FP02 T630mA (250V)
TP73 BC848C 5V REGULATOR
TP71 BD435 5V REGULATOR
100µ 25V
BP03
1 CMD14 RED
2 CMD18 GRY
3 U CA PST GRY
4 MOD GND GRY
5 +14V GRY
6 DIG GND GRY
7 +7V GRY
8 UH1/-21V GRY
9 UH2/-25V GRY
10 -25V GRY
TO BT03 0220 SERVO/LOGIC
BP02
1 -25V
2 +33V
3 +12V
4 +12V
5 GND
6 GND
7 +5V
8 +5V
TO BW06 0250 MAIN

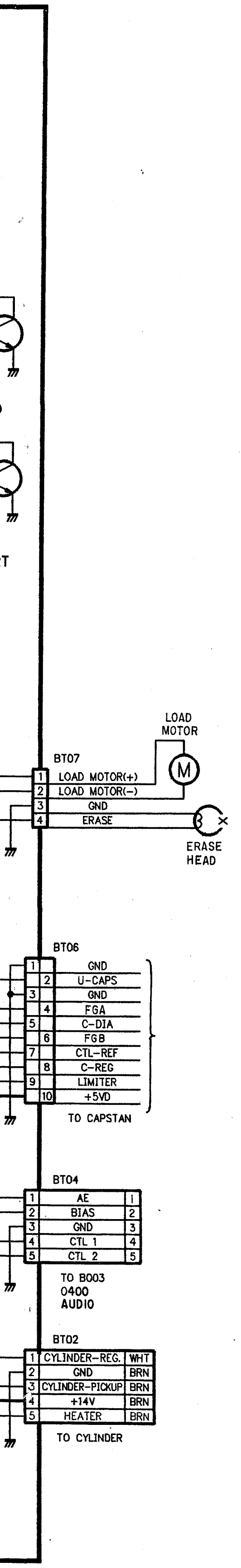
8-2. Key Display Circuit Diagram

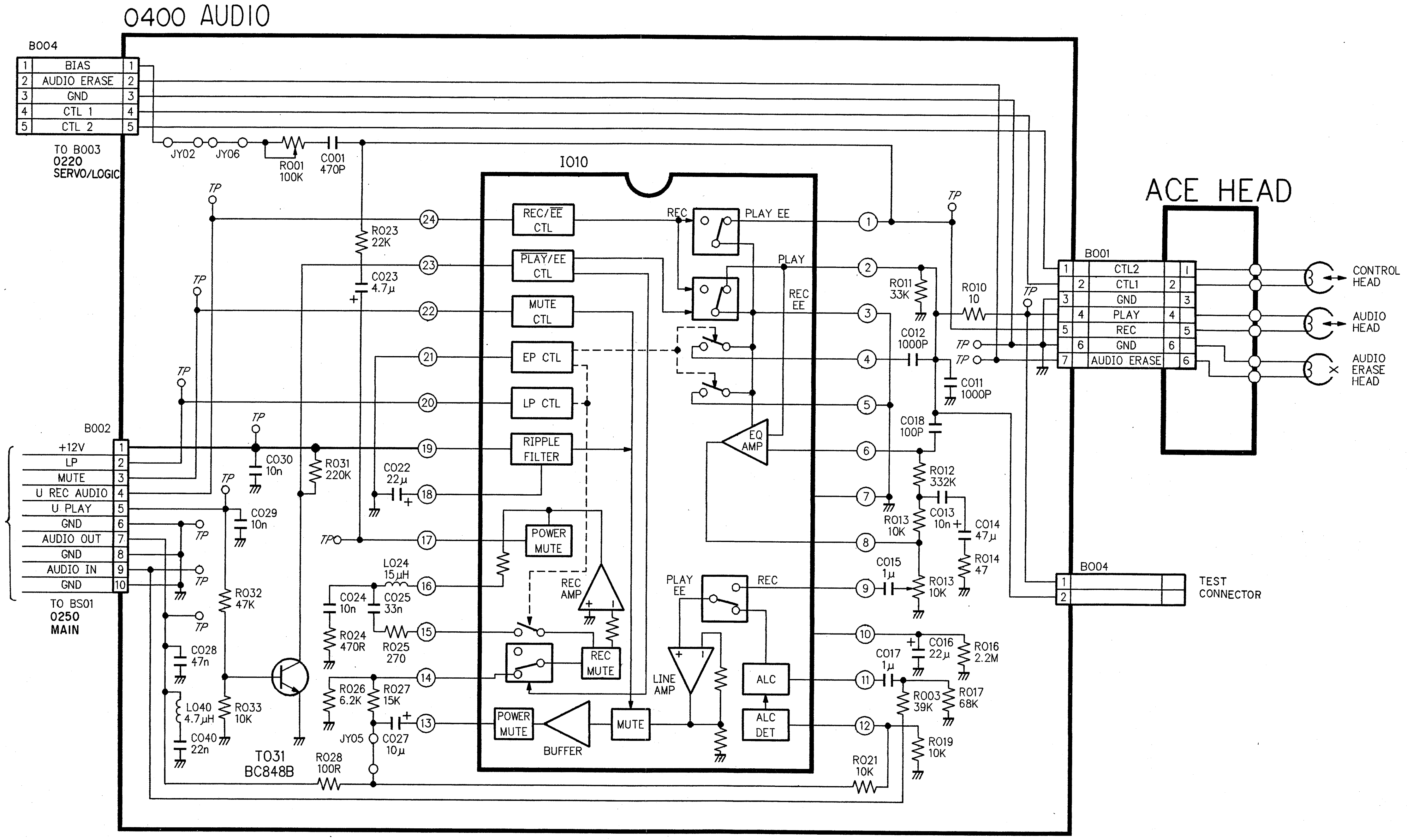

0220 KEY DISPLAY
GK01 7–BT–159GK
VIDEO TR PNR CANAL+ SP LP VPS
INDEX ME H M S DT P
TK04 BC548/B LED DRIVER
RK12 220
RK06 10K
RK38 10K
DK15 LL4148
RK55 5.6K
DK20 ZMN2.7
CK20 22NF
RK37 10K
CK07 0.1F
CK08 22n
RK15 22K
RK10 4.7K
RK11 1K
CK09 47µ
TK01 BC858B SWITCH
RK16 1K
RK17 2.2K
DK17 LL4148
TK03 BC548/B SWITCH
CK17 10nF
RK35 220
TK02 BC548/B SWITCH
RK13 68K
RK14 68K
RK44 4.7K
IK05 TMP87CK70F6028Z
G10 G11/POWER LED MONITOR R MONITOR L VDD VR STROBE VR DATA VR CLK IMIDENT SDA2 ENABLE STANDBY
G9 G8 G7 G6 G5 G4 G3 G2 G1
p SEG o SEG n SEG m SEG l SEG k SEG j SEG i SEG h SEG g SEG f SEG e SEG d SEG c SEG b SEG
DATA SDA CLK S OUT S IN SCK STROBE IR IN STOP VSS BM OUT BM IN RESET 32K OUT 32K IN TEST EEP CLK EEP DATA EEP IN EEP CS B192 HZ C+ IN AC CLK
a SEG VKK KEY IN0 KEY IN1 KEY IN 2 KEY IN 3 STEREO DUAL Hi–Fi MUTE 3 AUDIO L AUDIO R NC PICT
TP
RK54 220
RK36 10K
QK02 8MHz
CK14 33P
CK13 33P
QK01 32.768K
CK11 15P
CK10 5.6P
5P–30P CK12
RK01 10K
RK02 3.3K
RK03 10K
RK04 3.3K
RK05 10K
CK01 100P
CK02 100P
CK03 100P
CK04 100P
CK05 100P
RK07 4.7K
RK08 10K
RK09 10K
RK56 15K
RK32 220
RK33 220
RK34 220
BK02 (BLK)
1 –25V RED
2 UH 1 GRY
3 UH 2 GRY
4 +5V DIG. GRY
5 STOP GRY
6 RESET GRY
7 CLOCK GRY
8 DATA S GRY
9 DATA K GRY
10 GND GRY
11 VB 14 GRY
12 GND GRY
TO BT01 0220 SERVO/LOGIC
RK45 220
RK46 220
RK47 220
RK48 220
RK49 220
RK50 220
RK51 220
RK52 3.9K
RK53 220
BK01 (GRN)
1 STROBE RED
2 SCL GRY
3 GND GRY
4 DATA GRY
5 SDA GRY
6 ENABLE GRY
7 CAM P. GRY
8 MUTE 3 GRY
9 CH+ AKT IV GRY
10 SDA2 GRY
11 SHARPNESS GRY
12 STANDBY GRY
TO BW09 0250 MAIN
DK11 DK12 DK13 DK14 DK09 DK08 DK02
DK06 DK03
DK02,DK03 DK06,DK08 DK09 DK11~DK14 LL4148
V–312G V–322GS ONLY
V–312T V–322GS ONLY
RK28 22K
RK29 22K
RK30 22K
RK31 22K
IR01 HC327M
RK18 22K
RK27 10K
RK26 10K
RK25 10K
RK24 10K
CK16 100µ
RK20 4.7K
RK21 4.7K
RK22 4.7K
RK23 4.7K
IK01 TC89101P KEY DISPLAY MICROPROCESSOR
CK15 0.01µ
RK19 10K
0230 KEY BOARD
POWER SK16
EJECT SK14
GK02 TLG113A
BK05 BK04
1 GND
2 KEY IN
3 POWER
4 EJECT
5 PLED
6 NC
CH ↓ SK08
REC SK13
STOP SK07
PLAY SK03
REW SK10
FF SK09
CH ↑ SK05

8-3. Logic/Servo Circuit Diagram

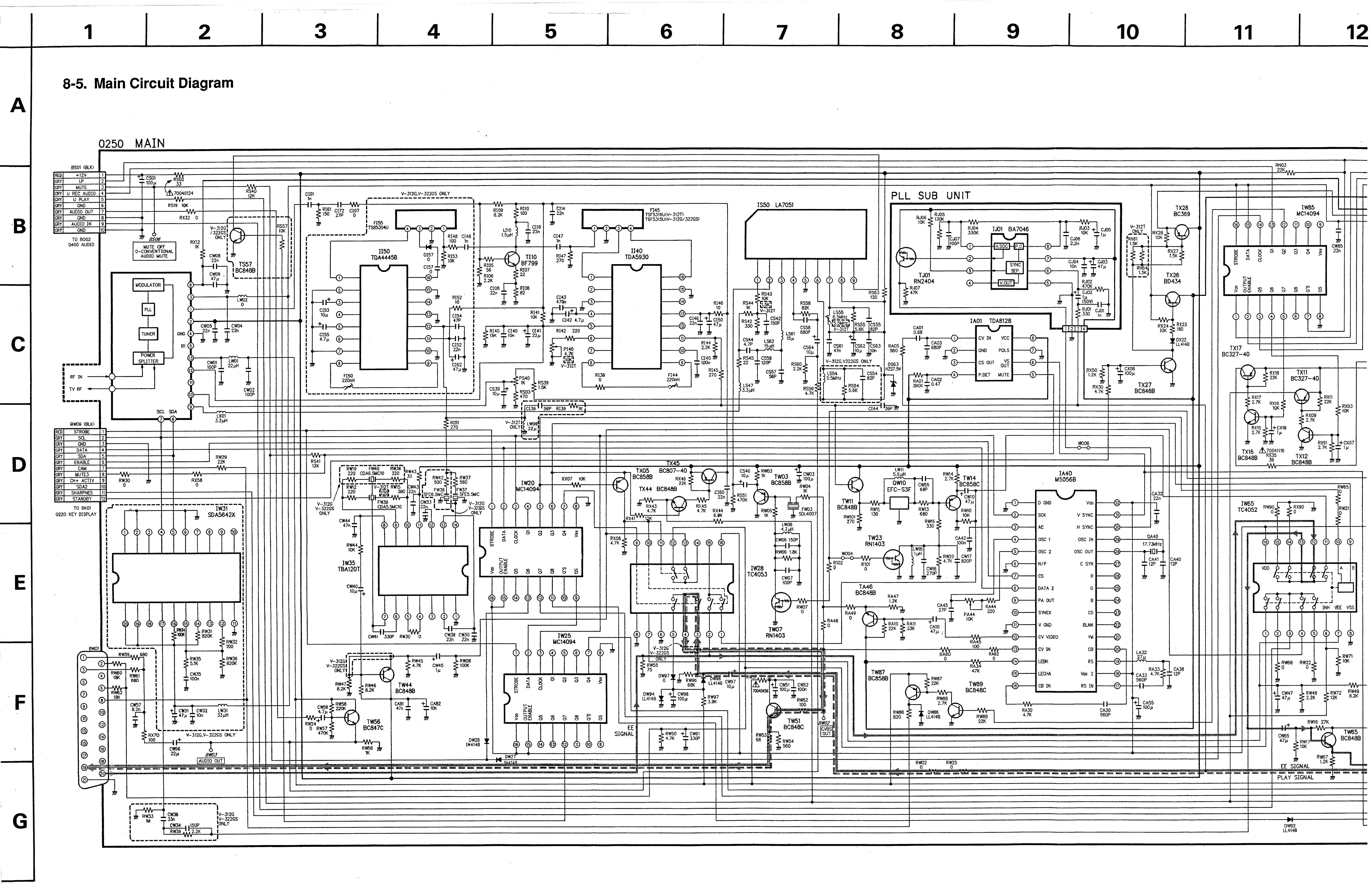

1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
0220 SERVO/LOGIC
BT01
-25V
UH1
UH2
+5VD
STOP
RESET
CLOCK
DATA S
DATA K
GND
+14V
GND
TO BK02 0230 KEY DISPLAY
BT03
CMD 14A
CMD 18A
U-CAPS
GND
+14V
GND
UH1
UH2
-25V
TO BP03 0100 POWER
BT06
GND
STROBE
DATA 1
CLOCK 1
VIDEO-ENW
PV
D-FF
V-PULS
HSS
CTL
HSR
NC
TO BW04 0250 MAIN
TT81 BC857B
TT82 BC857B
TT80 BC847B
TT79 BC847B
IT50 74HC14
GT26 TCST5133 REEL RIGHT
GT19 TCST5123 CAM 2
GT23 TCST5123 CAM 1
GT22 TCST5133 REEL RIGHT
TT30 BC847B
IT01 ST90T30-QFP80
QT66 24MHz
ST04
ST71
LT01 3.3µH
TT15 PT493F TAPE END
TT14 PT493F TAPE START
LOAD MOTOR
BT07
LOAD MOTOR(+)
LOAD MOTOR(-)
GND
ERASE
ERASE HEAD
TT26 PTZ2222A
TT25 BC847B
TT95 BC857C
IT60 L2726
LL01
TL01 BC337-40
70041075
IT40 U2559B
IT25 U25598
J131 STANDARD
J130 HI-FI
J119 STANDARD
TT12 BC847B
TT101 BC847B
TT40 BC857B
TT41 BCX19
BT08
GND
U-CAPS
GND
FGA
C-DIA
FGB
CTL-REF
C-REG
LIMITER
+5VD
TO CAPSTAN
BT04
AE
BIAS
GND
CTL 1
CTL 2
TO BO03 0400 AUDIO
BT02
CYLINDER-REG.
GND
CYLINDER-PICKUP
+14V
HEATER
WHT
BRN
TO CYLINDER

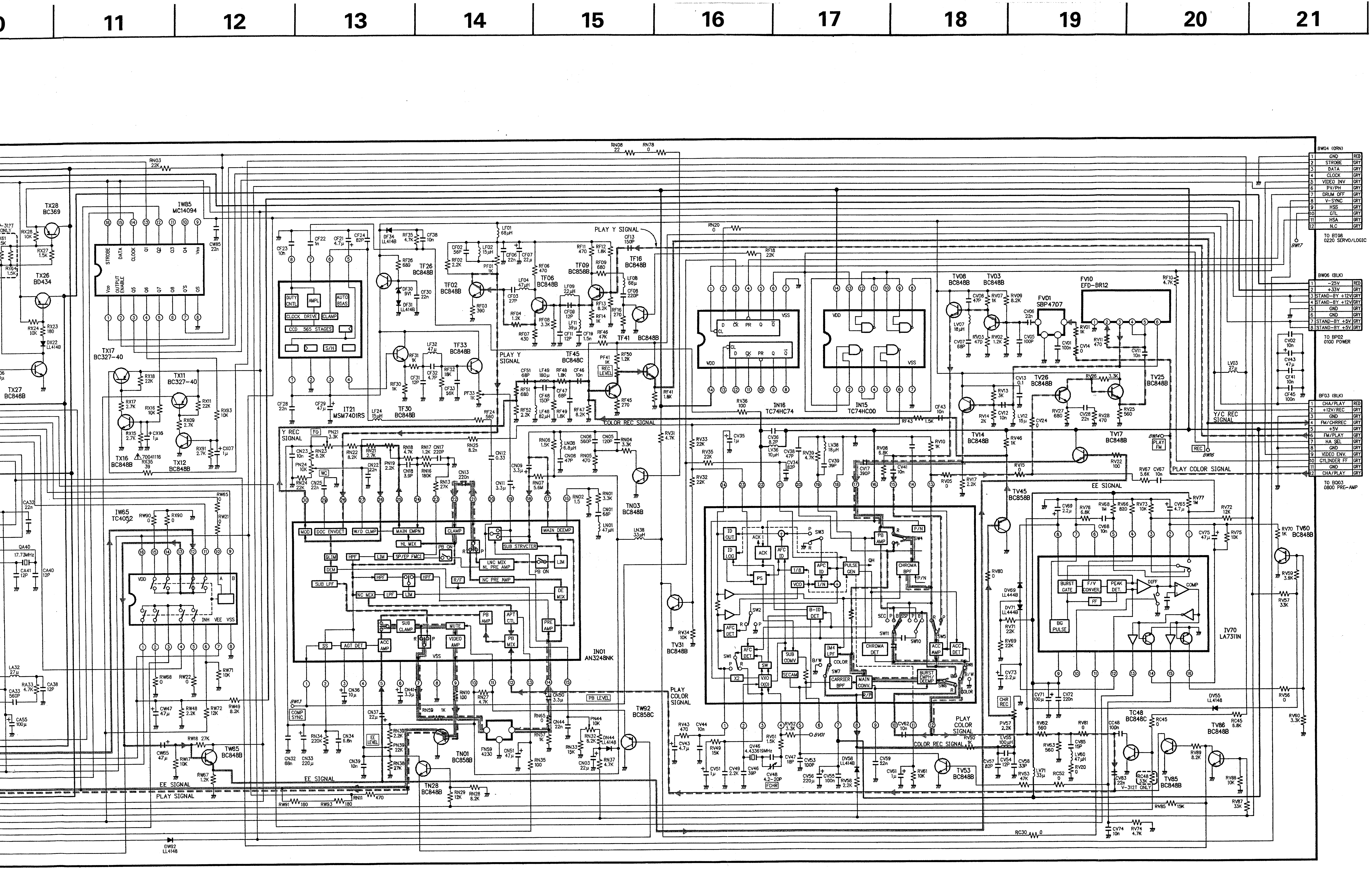
8-4. Audio Circuit Diagram


LOAD MOTOR
BT07
LOAD MOTOR(+)
LOAD MOTOR(−)
GND
ERASE
ERASE HEAD
BT06
GND
U-CAPS
GND
FGA
C-DIA
FGB
CTL-REF
C-REG
LIMITER
+5VD
TO CAPSTAN
BT04
AE
BIAS
GND
CTL 1
CTL 2
TO B003
0400
AUDIO
BT02
CYLINDER-REG.
GND
CYLINDER-PICKUP
+14V
HEATER
WHT
BRN
BRN
BRN
BRN
TO CYLINDER

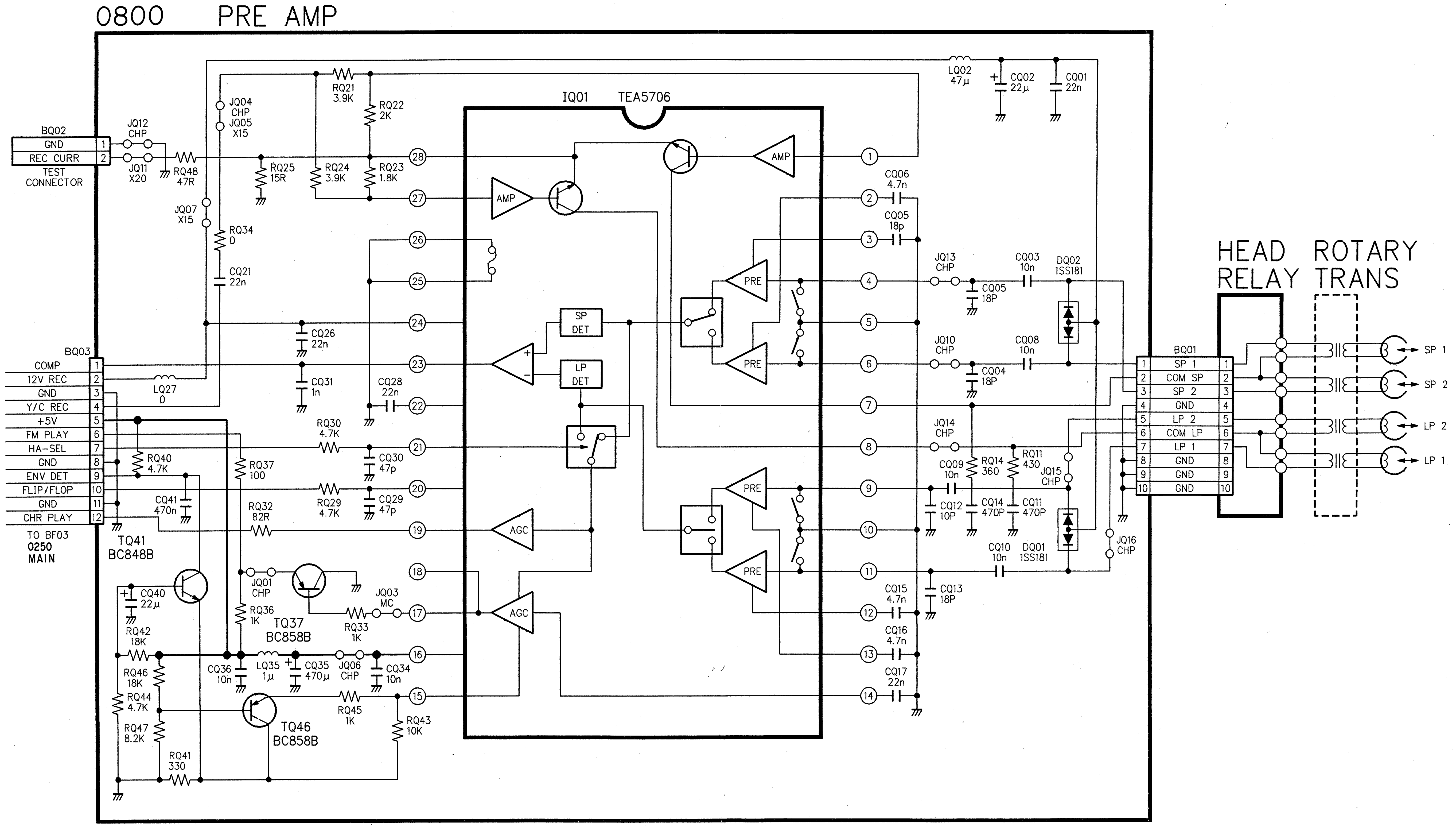

0400 AUDIO
B004
1 BIAS 1
2 AUDIO ERASE 2
3 GND 3
4 CTL 1 4
5 CTL 2 5
TO B003
0220
SERVO/LOGIC
JY02
JY06
R001 100K
C001 470P
I010
REC/EE CTL
PLAY/EE CTL
MUTE CTL
EP CTL
LP CTL
RIPPLE FILTER
POWER MUTE
REC AMP
REC MUTE
POWER MUTE
BUFFER
MUTE
LINE AMP
ALC
ALC DET
EQ AMP
REC
PLAY EE
PLAY
REC EE
PLAY EE
REC
TP
R023 22K
C023 4.7μ
C030 10n
R031 220K
C022 22μ
C029 10n
L024 15μH
C024 10n
C025 33n
R024 470R
R025 270
R026 6.2K
R027 15K
C027 10μ
JY05
R028 100R
R032 47K
R033 10K
C028 47n
L040 4.7μH
C040 22n
T031
BC848B
B002
+12V 1
LP 2
MUTE 3
U REC AUDIO 4
U PLAY 5
GND 6
AUDIO OUT 7
GND 8
AUDIO IN 9
GND 10
TO BS01
0250
MAIN
R011 33K
C012 1000P
R010 10
C011 1000P
C018 100P
R012 332K
C013 10n
C014 47μ
R013 10K
R014 47
C015 1μ
R013 10K
C016 22μ
R016 2.2M
C017 1μ
R003 39K
R017 68K
R019 10K
R021 10K
ACE HEAD
B001
1 CTL2 1
2 CTL1 2
3 GND 3
4 PLAY 4
5 REC 5
6 GND 6
7 AUDIO ERASE 6
CONTROL HEAD
AUDIO HEAD
AUDIO ERASE HEAD
B004
TEST CONNECTOR

8-5. Main Circuit Diagram

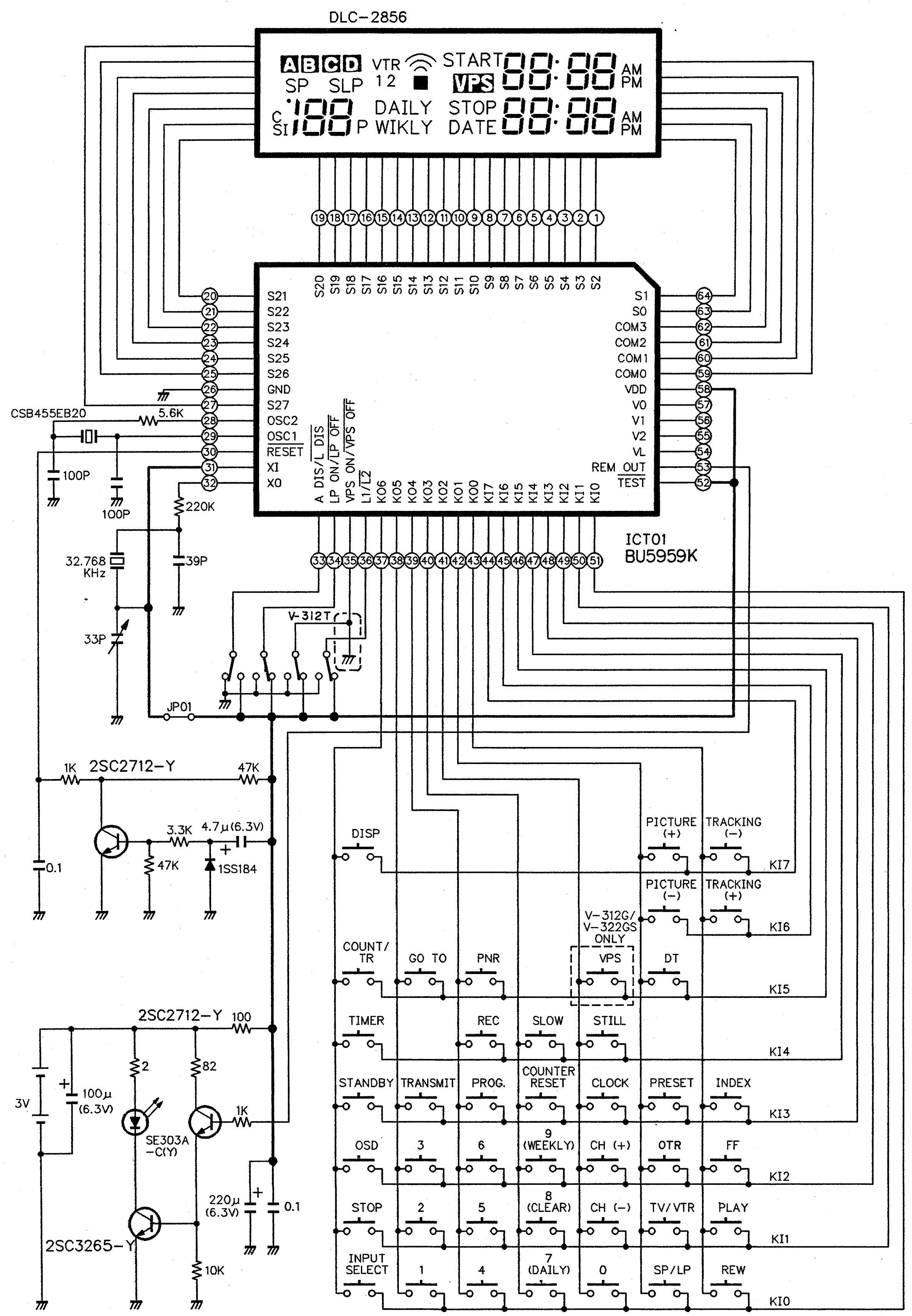

1
2
3
4
5
6
7
8
9
10
11
12
A
B
C
D
E
F
G
0250 MAIN
BS01 (BLK)
+12V
LP
MUTE
U REC AUDIO
U PLAY
GND
AUDIO OUT
GND
AUDIO IN
GND
TO B002
0400 AUDIO
MUTE OFF
0-CONVENTIONAL
AUDIO MUTE
MODULATOR
PLL
TUNER
POWER
SPLITTER
RF IN
TV RF
SCL SDA
BW09 (BLK)
STROBE
SCL
GND
DATA
SDA
ENABLE
CAM
MUTE3
CH+ ACTIV
SDA2
SHARPNESS
STANDBY
TO BK01
0220 KEY DISPLAY
IW31
SDA5642X
BW01
TS57
BC848B
II50
TDA4445B
V-312G,V-322GS ONLY
FI55
TS85304U
TI10
BF799
FI45
TSF5316U(V-312T)
TSF5315U(V-312G/322GS)
II40
TDA5930
IS50 LA7051
PLL SUB UNIT
IJ01 BA7046
TJ01
RN2404
H.SOC
SYNC SEP
V.OUT
IA01 TDA8128
CV IN
GND
CS OUT
P.DET
VCC
POLS
VS OUT
MUTE
TX28
BC369
TX26
BD434
TX27
BC848B
IW85
MC14094
TX17
BC327-40
TX11
BC327-40
TX16
BC848B
TX12
BC848B
IW35
TBA120T
IW20
MC14094
TX05
BC858B
TX45
BC807-40
TX44
BC848B
TW03
BC858B
TW11
BC848B
QW10
EFC-S3F
TW14
BC858C
TW23
RN1403
IW28
TC4053
TW07
RN1403
IW25
MC14094
TA46
BC848B
IA40
M5056B
IW65
TC4052
TW44
BC848B
TW56
BC847C
TW51
BC848C
TW87
BC858B
TW89
BC848C
TW65
BC848B
EE SIGNAL
PLAY SIGNAL
AUDIO OUT
CVBS OUT
STROBE
DATA
CLOCK
OUTPUT ENABLE
D GND
SCK
AC
OSC 1
OSC 2
N/P
CS
DATA 2
PA OUT
SYNEX
V GND
CV VIDEO
CV IN
LEBK
LECHA
CB IN
V SYNC
H SYNC
OSC IN
OSC OUT
C SYN
BLNK
RS IN
VDD
INH
VEE
VSS


11
12
13
14
15
16
17
18
19
20
21
TX28 BC369
TX26 BD434
TX27 BC848B
TX17 BC327-40
TX11 BC327-40
TX16 BC848B
TX12 BC848B
IW85 MC14094
STROBE
DATA
CLOCK
OUTPUT ENABLE
IW65 TC4052
TW65 BC848B
EE SIGNAL
PLAY SIGNAL
DW92 LL4148
IT21 MSM7401RS
CCD 565 STAGES
CLOCK DRIVE
CLAMP
DUTY CNTL
AMPL
AUTO BIAS
S/H
TF26 BC848B
TF30 BC848B
TF33 BC848B
TF02 BC848B
TF06 BC848B
TF09 BC858B
TF16 BC848B
TF41 BC848B
TF45 BC848C
PLAY Y SIGNAL
Y REC SIGNAL
COLOR REC SIGNAL
REC LEVEL
IN01 AN3248NK
MAIN EMPH
MAIN DEEMP
HL MIX
SUB EMPH
LNC MIX NL PRE AMP
NC PRE AMP
PB ON
SUB STRVCTER
D.LIM
DEM
SUB LPF
NC MIX
LPF
LIM
HPF
R/F
DE MIX
PB AMP
APT CTL
PB MIX
PRE AMP
VIDEO AMP
MUTE
SUB CLAMP
ACC AMP
AGT DET
SS
COMP SYNC
EE LEVEL
PB LEVEL
TN01 BC858B
TN28 BC848B
TN03 BC848B
TW92 BC858C
PLAY COLOR SIGNAL
IN16 TC74HC74
IN15 TC74HC00
TV31 BC848B
TV08 BC848B
TV03 BC848B
FV01 SBP4707
FV10 EFD-BR12
TV26 BC848B
TV25 BC848B
TV14 BC848B
TV17 BC848B
TV45 BC858B
Y/C REC SIGNAL
PLAY COLOR SIGNAL
PLAY FM
REC
EE SIGNAL
ID OUT
ID LOG
ACK
AFC ID
APC ID
PULSE GEN
PB AMP
CHROMA BPF
P/N
1/8
VCO
PS
B-ID DET
CHROMA DET
SUB CONV
SECAM
VXO (X0)
CARRIER BPF
MAIN CONV
BURST EMPH/DEEMP
ACC AMP
ACC DET
COLOR
B/W
COLOR REC SIGNAL
FCHR
TV53 BC848B
CHR REC
IV70 LA7311N
BURST GATE
F/V CONVER
PEAK DET.
DIFF
COMP
FF
BG PULSE
TV60 BC848B
TC48 BC848C
TV85 BC848B
TV86 BC848B
V-312T ONLY
BW04 (GRN)
1 GND RED
2 STROBE GRY
3 DATA GRY
4 CLOCK GRY
5 VIDEO INV GRY
6 PV/PH GRY
7 DRUM OFF GRY
8 V-SYNC GRY
9 HSS GRY
10 GTL GRY
11 HSA GRY
12 N.C GRY
TO BT08 0220 SERVO/LOGIC
BW06 (BLK)
1 -25V RED
2 +33V GRY
3 STAND-BY +12V GRY
4 STAND-BY +12V GRY
5 GND GRY
6 GND GRY
7 STAND-BY +5V GRY
8 STAND-BY +5V GRY
TO BP02 0100 POWER
BF03 (BLK)
1 CHA/PLAY RED
2 +12V/REC GRY
3 GND GRY
4 FM/CHRREC GRY
5 +5V GRY
6 FM/PLAY GRY
7 HA SEL GRY
8 GND GRY
9 VIDEO ENV. GRY
10 CYLINDER FF GRY
11 GND GRY
12 CHA/PLAY GRY
TO BO03 0800 PRE-AMP

8-6. Pre Amp Circuit Diagram


0800 PRE AMP
IQ01 TEA5706
BQ02
GND 1
REC CURR 2
TEST CONNECTOR
JQ12 CHP
JQ11 X20
RQ48 47R
JQ04 CHP
JQ05 X15
JQ07 X15
RQ34 0
CQ21 22n
RQ21 3.9K
RQ22 2K
RQ25 15R
RQ24 3.9K
RQ23 1.8K
LQ02 47μ
CQ02 22μ
CQ01 22n
AMP
PRE
SP DET
LP DET
AGC
CQ26 22n
CQ31 1n
CQ28 22n
RQ30 4.7K
CQ30 47p
RQ29 4.7K
CQ29 47p
RQ32 82R
RQ37 100
RQ40 4.7K
CQ41 470n
LQ27 0
BQ03
COMP 1
12V REC 2
GND 3
Y/C REC 4
+5V 5
FM PLAY 6
HA-SEL 7
GND 8
ENV DET 9
FLIP/FLOP 10
GND 11
CHR PLAY 12
TO BF03 0250 MAIN
TQ41 BC848B
CQ40 22μ
RQ42 18K
RQ46 18K
RQ44 4.7K
RQ47 8.2K
RQ41 330
JQ01 CHP
RQ36 1K
TQ37 BC858B
JQ03 MC
RQ33 1K
CQ36 10n
LQ35 1μ
CQ35 470μ
JQ06 CHP
CQ34 10n
RQ45 1K
RQ43 10K
TQ46 BC858B
CQ06 4.7n
CQ05 18p
JQ13 CHP
CQ03 10n
CQ05 18P
DQ02 1SS181
JQ10 CHP
CQ08 10n
CQ04 18P
JQ14 CHP
CQ09 10n
RQ14 360
RQ11 430
JQ15 CHP
CQ12 10P
CQ14 470P
CQ11 470P
CQ10 10n
DQ01 1SS181
JQ16 CHP
CQ13 18P
CQ15 4.7n
CQ16 4.7n
CQ17 22n
HEAD RELAY
ROTARY TRANS
BQ01
1 SP 1 1
2 COM SP 2
3 SP 2 3
4 GND 4
5 LP 2 5
6 COM LP 6
7 LP 1 7
8 GND 8
9 GND 9
10 GND 10
SP 1
SP 2
LP 2
LP 1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

8-7. Remote Control Circuit Diagram



DLC-2856
ABCD VTR START AM PM
SP SLP 1 2 VPS
C SI P DAILY WIKLY STOP DATE AM PM
S21 S22 S23 S24 S25 S26 GND S27 OSC2 OSC1 RESET XI XO
S20 S19 S18 S17 S16 S15 S14 S13 S12 S11 S10 S9 S8 S7 S6 S5 S4 S3 S2
S1 SO COM3 COM2 COM1 COMO VDD VO V1 V2 VL REM OUT TEST
A DIS/L DIS
LP ON/LP OFF
VPS ON/VPS OFF
L1/L2
KO6 KO5 KO4 KO3 KO2 KO1 KO0 KI7 KI6 KI5 KI4 KI3 KI2 KI1 KI0
ICT01
BU5959K
CSB455EB20
5.6K
100P
100P
220K
32.768 KHz
39P
33P
V-312T
JP01
1K 2SC2712-Y
47K
3.3K
4.7μ(6.3V)
47K
1SS184
0.1
2SC2712-Y 100
3V
100μ (6.3V)
2
82
1K
SE303A -C(Y)
220μ (6.3V)
0.1
2SC3265-Y
10K
DISP
PICTURE (+)
TRACKING (−)
KI7
PICTURE (−)
TRACKING (+)
KI6
V-312G/ V-322GS ONLY
COUNT/ TR
GO TO
PNR
VPS
DT
KI5
TIMER
REC
SLOW
STILL
KI4
STANDBY
TRANSMIT
PROG.
COUNTER RESET
CLOCK
PRESET
INDEX
KI3
OSD
3
6
9 (WEEKLY)
CH (+)
OTR
FF
KI2
STOP
2
5
8 (CLEAR)
CH (−)
TV/VTR
PLAY
KI1
INPUT SELECT
1
4
7 (DAILY)
0
SP/LP
REW
KI0

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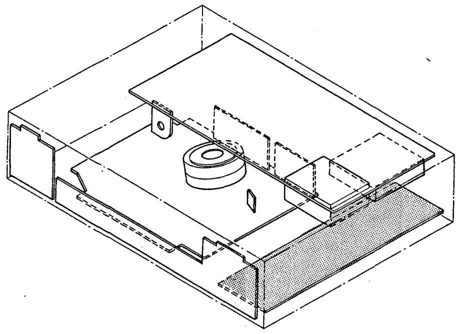
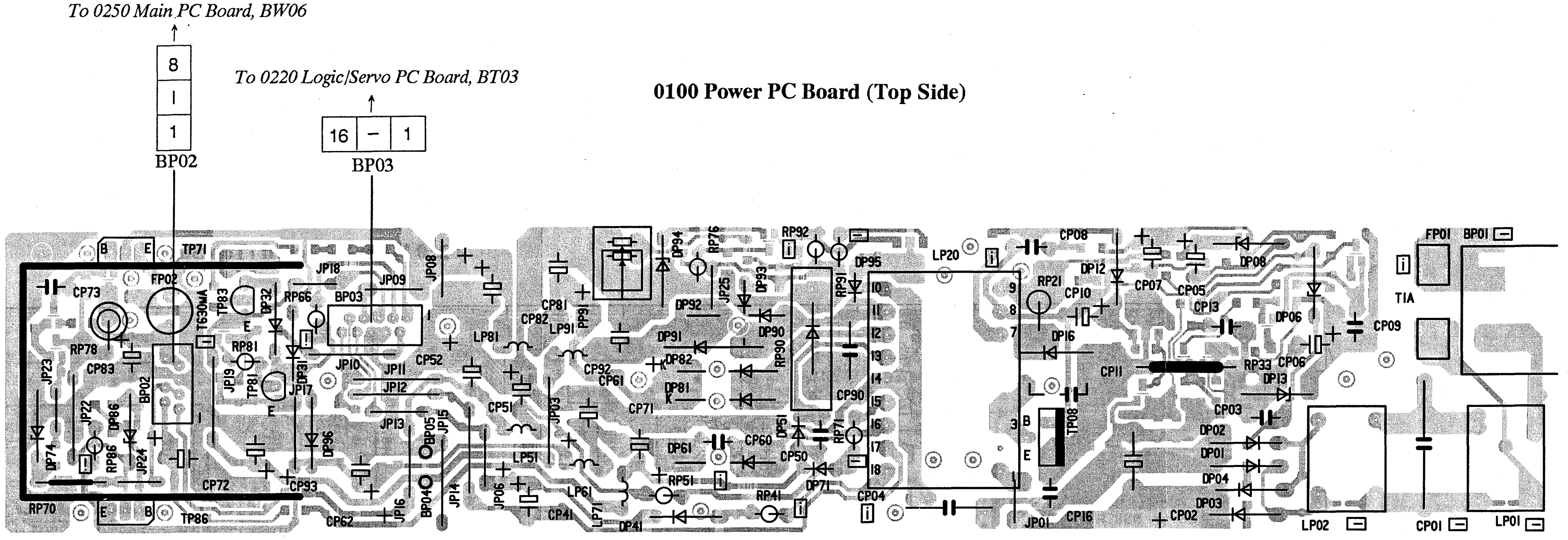
9. PC Boards

9-1. Power Supply PC Board




To 0250 Main PC Board, BW06
8
|
1
BP02
To 0220 Logic/Servo PC Board, BT03
16
–
1
BP03
B
E
TP71
TP86
RP70
FP01
BP01
LP02
CP01
LPO1
T1A
CP09
CP08
LP20
JP01
CP16
CP02

0100 Power PC Board (Top Side)

1 2 3 4 5 6 7 8 9 10 11

D C B A A B C D

Location of Diodes

Symbol No.	Location
DP01	A-9
DP02	A-9
DP03	A-9
DP04	A-9
DP06	B-10
DP07	B-9*
DP08	B-9
DP09	B-9*
DP11	B-10*
DP12	B-9
DP13	B-10
DP14	B-10*
DP16	B-8
DP31	B-5
DP32	B-4
DP41	A-6

Location of Diodes

Symbol No.	Location
DP51	A-7
DP61	A-6
DP71	A-7
DP74	A-3
DP81	B-6
DP82	B-6
DP86	B-4
DP90	B-7
DP91	B-6
DP92	B-7
DP93	B-7
DP94	B-6
DP95	B-7
DP96	A-5
DP97	
DP98	

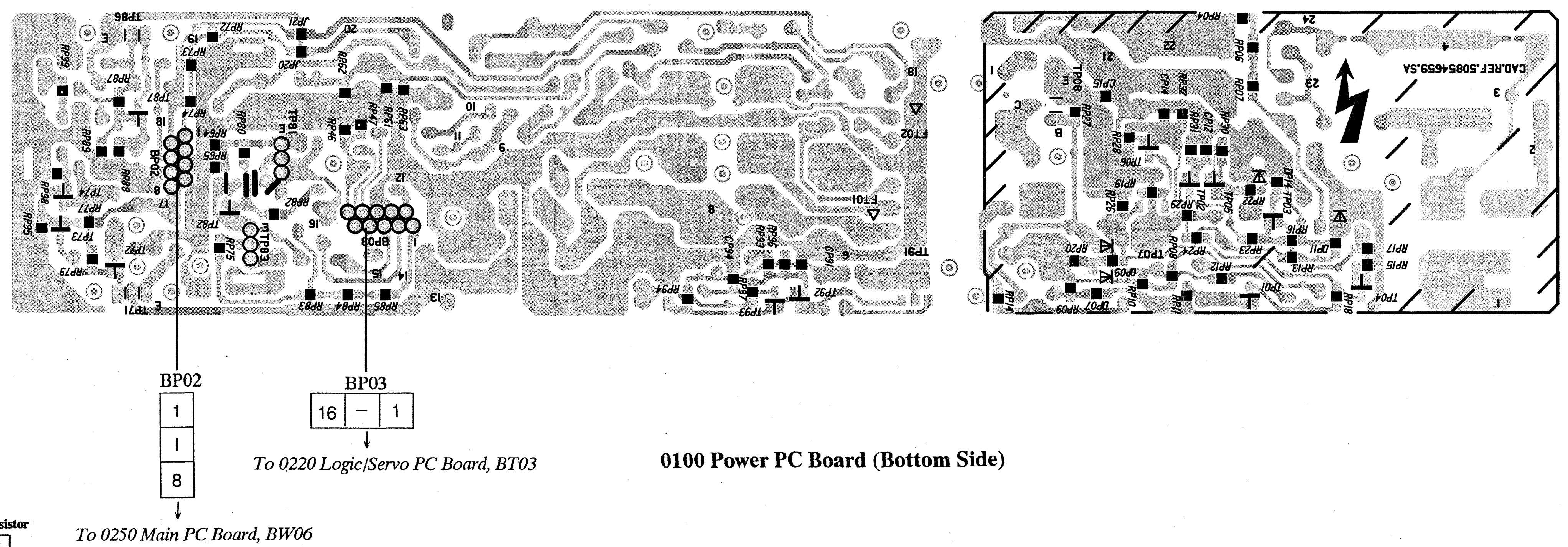
Voltage and Location of Transistors

V: REC, (V): PLAY

Symbol No.	Voltage (Unit:V)			Function	Location
	E	C	B		
TP01	26	22	26	Primary regulator	B-9*
TP02	18	19	0	Secondary regulator	B-9*
TP03	18	18	18	Secondary regulator	B-10*
TP04	18	20	18	Secondary regulator	B-10*
TP05	18	18	18		B-9*
TP06	19	25	18	Power switch	B-9*
TP07			25	Power switch	B-9*
TP08				Power switch	A-8*
TP71	3.3	6.6	6.0	5V regulator	B-4
TP72	6	12	6.5	5V regulatr	B-4*
TP73	4.8	6.6	5.3	5V regulator	B-3*
TP74	4.8	12	5.2	11V regulator	B-3*
TP81	22.7	22.2	6.6	Capstan voltage switch	B-4
TP82	23	15.3	22.8	Capstan voltage switch	B-4*
TP83	14.1	14.1	0.4	14V swtich	B-4
TP86	15	14.1	14.2	11V regulator	A-4
TP87	1.6	14.2	2.2	11V regulator	B-4*
TP91	1.5	33.3	14.3	14V regulator	B-8*
TP92	2	2.2	10.3	14V regulator	B-7*
TP93	2	5	10.5		C-7*

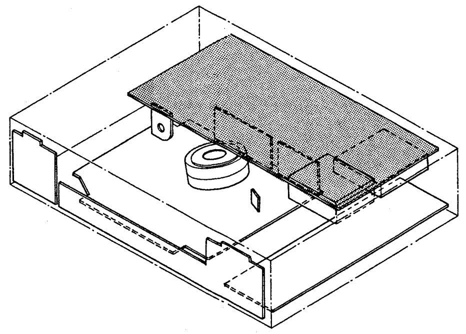
Location of Resistor

Symbol No.	Location
PP91	B-6

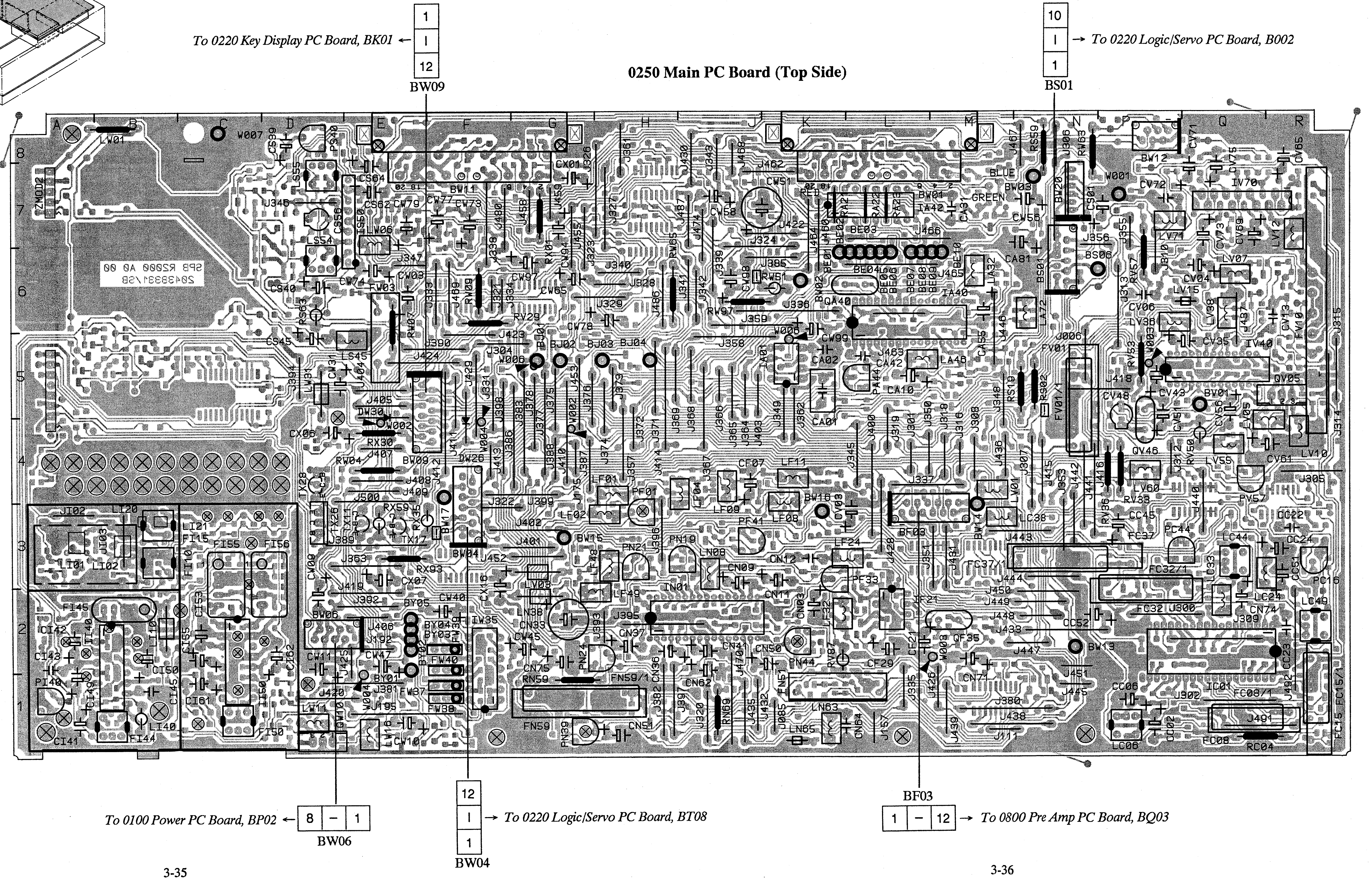

BP02
1
|
8
To 0250 Main PC Board, BW06
BP03
16
–
1
To 0220 Logic/Servo PC Board, BT03
CAD.REF.50854659.5A

0100 Power PC Board (Bottom Side)

9-2. Main PC Board



0250 Main PC Board (Top Side)


To 0220 Key Display PC Board, BK01
1
|
12
BW09
To 0220 Logic/Servo PC Board, B002
10
|
1
BS01
To 0100 Power PC Board, BP02
8 – 1
BW06
12
|
1
BW04
To 0220 Logic/Servo PC Board, BT08
BF03
1 – 12
To 0800 Pre Amp PC Board, BQ03

IA01

Pin No.	Voltage (Unit: V)
	T/G,GS
1	4(3.6)
2	0(0)
3	0.38(0.08)
4	5(0.9)
5	0.13(5)/
6	0.17(0.11)
7	0(0)
8	11.76(11.8)/ 11.76(11.83)

IS50

Pin No.	Voltage (Unit: V)
	T/G,GS
1	4.4(4.4)
2	5.8(5.69)
3	4.19(4.2)
4	2.5(2.5)
5	0(0)
6	3.97(3.97)
7	7.4(7.46)
8	7.5(7.5)
9	5.9(5.9)

IW20

Pin No.	Voltage (Unit: V)
	T/G,GS
1	0(0)
2	3.4(3.4)/3.7(3.7)
3	3.3(3.3)/3.5(3.5)
4	0(0)
5.	5.3(5.3)/5.2(5.2)
6	5.3(5.3)/5.2(5.2)
7	5.3(5.3)/5.2(5.2)
8	0(0)
9	1(1)/1.5(1.5)
10	–(–)/0.9(0.9)
11	0(0)
12	0(0)
13	0(0)
14	0(0)
15	5.3(5.3)/5.2(5.2)
16	5.3(5.3)/5.2(5.2)

IW25

Pin No.	Voltage (Unit: V)
	T/G,GS
1	0(0)
2	1(1)/1.5(1.5)
3	0(0)
4	0(0)
5	0(0)
6	0(0)
7	0(0)
8	0(0)
9	2(2)/2.9(3)
10	1(1)/0.9(0.9)
11	5.3(5.3)/0(0)
12	0(0)
13	0(0)
14	0(0)
15	5.3(5.3)/5.2(5.2)
16	5.3(5.3)/5.2(5.2)

IW31

Pin No.	Voltage (Unit: V)
	V-312G, 322GS
1	0(0)
2	0(0)
3	0(0)
4	3.5(3.5)
5	4.9(4.9)
6	0(0)
7	5.1(0.5)
8	0(0)
9	5.1(5.1)
10	0(0)
11	0(0)
12	0(0)
13	0(0)
14	1.2(1.7)
15	0(0)
16	5.1(3.5)
17	1.2(1.4)
18	0(0)
19	5.2(5.2)
20	5.2(5.2)

IW35

Pin No.	Voltage (Unit: V)
	T/G,GS
1	0(0)/0.1(0)
2	2.1(2.1)
3	4.4(4.4)
4	5.1(5.1)
5	–(–)
6	2.2(2.16)
7	3(3)
8	2.51(2.8)/3.7(1.8)
9	3.08(3.08)/3(3)
10	2.2(2.2)/2.1(2.1)
11	11.25(11.25)/11.2
12	–(–)/2.8(2.8)
13	4.5(4.7)/3.7(3.7)
14	4.5(4.7)/0(0)

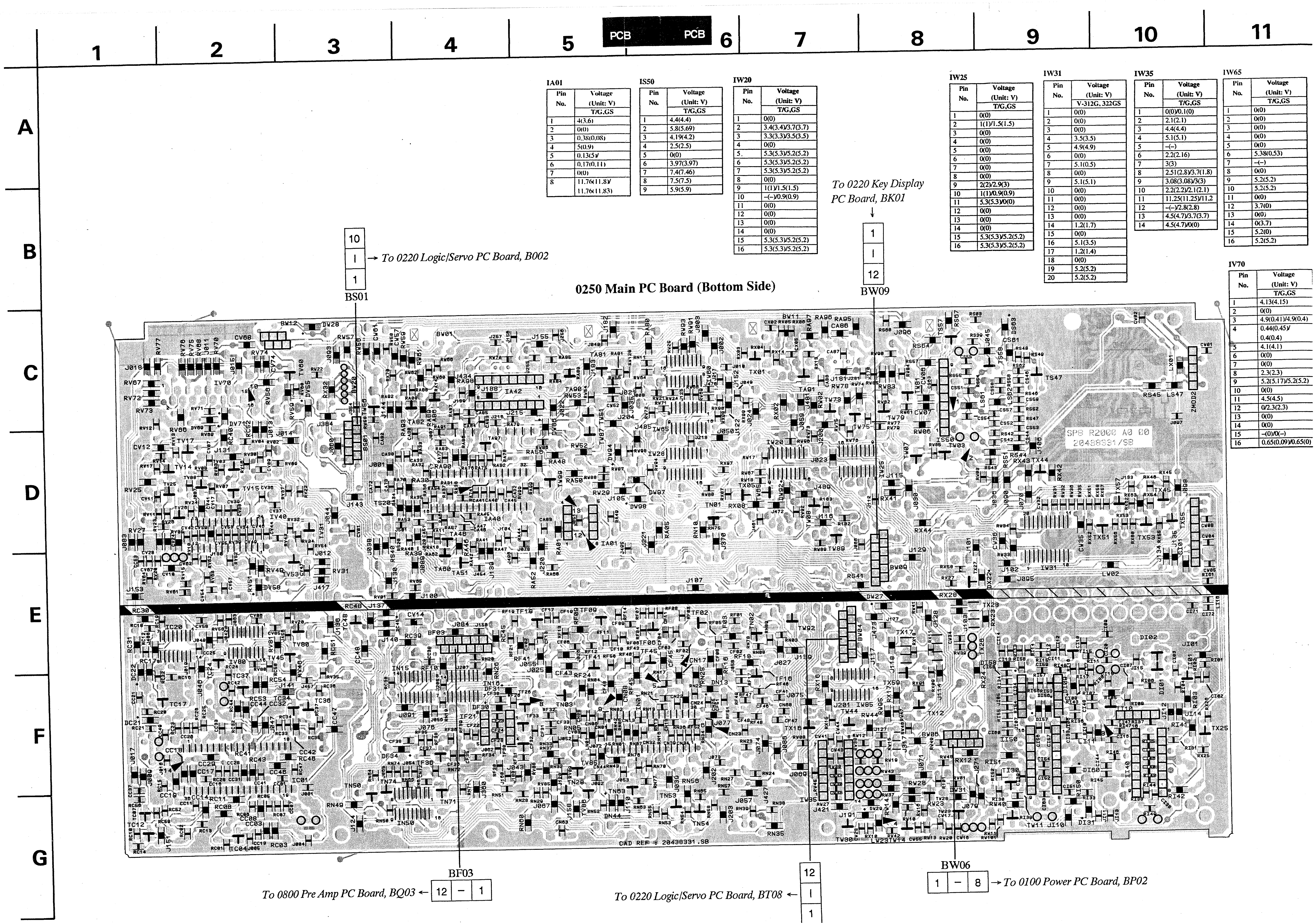
IW65

Pin No.	Voltage (Unit: V)
	T/G,GS
1	0(0)
2	0(0)
3	0(0)
4	0(0)
5	0(0)
6	5.38(0.53)
7	–(–)
8	0(0)
9	5.2(5.2)
10	5.2(5.2)
11	0(0)
12	3.7(0)
13	0(0)
14	0(3.7)
15	5.2(0)
16	5.2(5.2)

IV70

Pin No.	Voltage (Unit: V)
	T/G,GS
1	4.13(4.15)
2	0(0)
3	4.9(0.41)/4.9(0.4)
4	0.44(0.45)/ 0.4(0.4)
5	4.1(4.1)
6	0(0)
7	0(0)
8	2.3(2.3)
9	5.2(5.17)/5.2(5.2)
10	0(0)
11	4.5(4.5)
12	0/2.3(2.3)
13	0(0)
14	0(0)
15	–(0)/0(–)
16	0.65(0.09)/0.65(0)

0250 Main PC Board (Bottom Side)


1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
To 0220 Key Display PC Board, BK01
BW09
1
12
BS01
10
1
To 0220 Logic/Servo PC Board, B002
SPB R2000 A0 00
20438331/SB
CAD REF : 20438331.SB
BF03
12
1
To 0800 Pre Amp PC Board, BQ03
BW04
12
1
To 0220 Logic/Servo PC Board, BT08
BW06
1
8
To 0100 Power PC Board, BP02

IA01

Pin No.	Voltage (Unit: V)
	T/G,GS
1	4(3.6)
2	0(0)
3	0.38(0.08)
4	5(0.9)
5	0.13(5)/
6	0.17(0.11)
7	0(0)
8	11.76(11.8)/ 11.76(11.83)

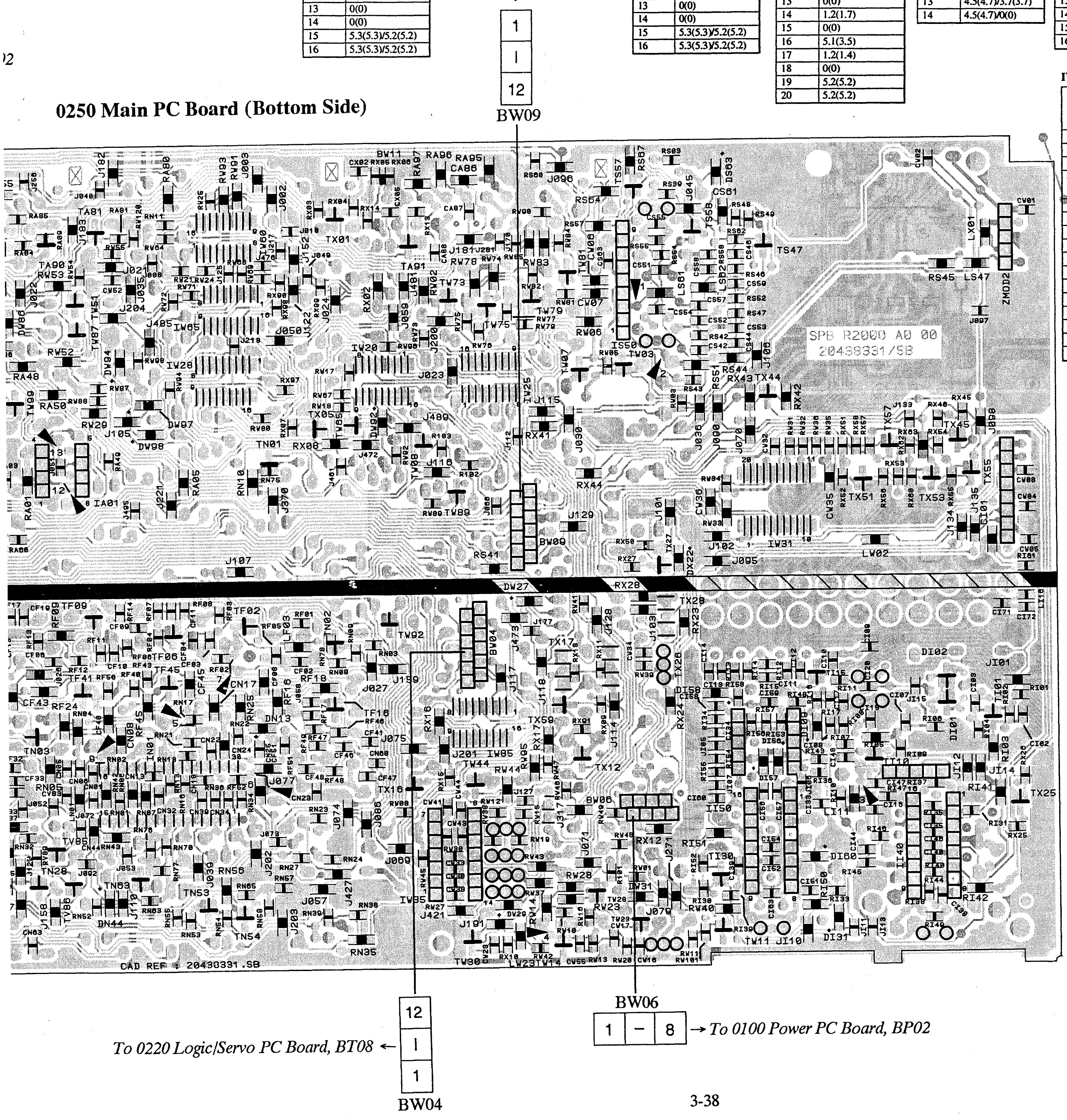
IS50

Pin No.	Voltage (Unit: V)
	T/G,GS
1	4.4(4.4)
2	5.8(5.69)
3	4.19(4.2)
4	2.5(2.5)
5	0(0)
6	3.97(3.97)
7	7.4(7.46)
8	7.5(7.5)
9	5.9(5.9)

IW20

Pin No.	Voltage (Unit: V)
	T/G,GS
1	0(0)
2	3.4(3.4)/3.7(3.7)
3	3.3(3.3)/3.5(3.5)
4	0(0)
5.	5.3(5.3)/5.2(5.2)
6	5.3(5.3)/5.2(5.2)
7	5.3(5.3)/5.2(5.2)
8	0(0)
9	1(1)/1.5(1.5)
10	–(–)/0.9(0.9)
11	0(0)
12	0(0)
13	0(0)
14	0(0)
15	5.3(5.3)/5.2(5.2)
16	5.3(5.3)/5.2(5.2)

0250 Main PC Board (Bottom Side)


To 0220 Key Display PC Board, BK01
1
1
12
BW09
SPB R2000 A0 00
20438331/SB
CAD REF : 20430331.SB
12
1
1
BW04
To 0220 Logic/Servo PC Board, BT08
BW06
1
8
To 0100 Power PC Board, BP02

IW25

Pin No.	Voltage (Unit: V)
	T/G,GS
1	0(0)
2	1(1)/1.5(1.5)
3	0(0)
4	0(0)
5	0(0)
6	0(0)
7	0(0)
8	0(0)
9	2(2)/2.9(3)
10	1(1)/0.9(0.9)
11	5.3(5.3)/0(0)
12	0(0)
13	0(0)
14	0(0)
15	5.3(5.3)/5.2(5.2)
16	5.3(5.3)/5.2(5.2)

IW31

Pin No.	Voltage (Unit: V)
	V-312G, 322GS
1	0(0)
2	0(0)
3	0(0)
4	3.5(3.5)
5	4.9(4.9)
6	0(0)
7	5.1(0.5)
8	0(0)
9	5.1(5.1)
10	0(0)
11	0(0)
12	0(0)
13	0(0)
14	1.2(1.7)
15	0(0)
16	5.1(3.5)
17	1.2(1.4)
18	0(0)
19	5.2(5.2)
20	5.2(5.2)

IW35

Pin No.	Voltage (Unit: V)
	T/G,GS
1	0(0)/0.1(0)
2	2.1(2.1)
3	4.4(4.4)
4	5.1(5.1)
5	–(–)
6	2.2(2.16)
7	3(3)
8	2.51(2.8)/3.7(1.8)
9	3.08(3.08)/3(3)
10	2.2(2.2)/2.1(2.1)
11	11.25(11.25)/11.2
12	–(–)/2.8(2.8)
13	4.5(4.7)/3.7(3.7)
14	4.5(4.7)/0(0)

IW65

Pin No.	Voltage (Unit: V)
	T/G,GS
1	0(0)
2	0(0)
3	0(0)
4	0(0)
5	0(0)
6	5.38(0.53)
7	–(–)
8	0(0)
9	5.2(5.2)
10	5.2(5.2)
11	0(0)
12	3.7(0)
13	0(0)
14	0(3.7)
15	5.2(0)
16	5.2(5.2)

IV70

Pin No.	Voltage (Unit: V)
	T/G,GS
1	4.13(4.15)
2	0(0)
3	4.9(0.41)/4.9(0.4)
4	0.44(0.45)/ 0.4(0.4)
5	4.1(4.1)
6	0(0)
7	0(0)
8	2.3(2.3)
9	5.2(5.17)/5.2(5.2)
10	0(0)
11	4.5(4.5)
12	0/2.3(2.3)
13	0(0)
14	0(0)
15	–(0)/0(–)
16	0.65(0.09)/0.65(0)

II40

Pin No.	Voltage (Unit: V)
	T/G,GS
1	0(5)/0(4.47)
2	0(3)/0(2.3)
3	0(0)
4	2.7(2.3)/0.3(3)
5	0(3)/0(3.3)
6	0(2.26)/0(1.4)
7	0(0)
8	0(6.8)/0(7.5)
9	0(6.8)/0(7.5)
10	0(4.3)/0(3.46)
11	0(5.17)/0(3.3)
12	0(7.2)/0(10.9)
13	0(10.9)/0(0)
14	0(0)
15	0(0)
16	0(5)/0(4.47)

II50

Pin No.	Voltage (Unit: V)
	V-312G, 322GS
1	0(4.5)
2	0(0)
3	0.3(3.51)
4	0.05(3)
5	0.17(3.3)
6	0(1.4)
7	0(0)
8	0(7.5)
9	0(4.76)
10	0(0)
11	0(10.9)
12	0(4.9)
13	0(0)
14	0(0)
15	0(0)
16	0(4.5)

IA40

Pin No.	Voltage (Unit: V)
	T/G.GS
1	0(0)
2	3(3)
3	5.2(5.2)
4	2.5(2.5)
5	2.4(2.4)
6	0(0)
7	1(1)
8	3(3)
9	0(0)
10	5.3(5.3)
11	0(0)
12	1.3(1.3)
13	1.3(7)/1.3(1)
14	0.74(0.74)
15	2.14(2.1)
16	0.68(0.68)
17	11.4(11.4)/ 11.4(11.42)
18	5.32(5.3)
19	0(0)
20	0(0)
21	0(0)
22	0(0)
23	0(0)
24	0(0)
25	0(0)
26	0(0)
27	4.8(4.8)
28	2.4(2.4)
29	2.4(2.4)
30	1.7(1.7)
31	0.17(0.11)/ 0.17(0.17)
32	5.32(5.3)

IV40

Pin No.	Voltage (Unit: V)
	T/G,GS
1	2.52(2.5)/2.5(2.5)
2	3.76(3.75)
3	2.47(2.75)
4	3.4(3.78)
5	3.04(3)/3(3)
6	2.3(2.1)
7	5.19(5.2)/ 5.19(5.2)
8	4.81(2.3)
9	1.78(1.77)/ 1.78(1.79)
10	0.77(3.17)
11	0.92(0.92)/ 0.9(0.9)
12	2.56(2.3)
13	1.82(1.72)
14	3.1(3.7)
15	2.8(1.8)
16	5.19(5.18)/ 5.2(5.2)
17	2.8(2.8)
18	0(0)
19	1.4(2.28)
20	3.2(3.17)/ 3.2(3.2)
21	0.3(0.3)
22	5.2(5.19)/ 5.2(5.2)
23	–(–)
24	2.5(2.5)

IN01

Pin No.	Voltage (Unit: V)
	T/G,GS
1	0.42(0.42)
2	2.6(0)
3	2.14(2.4)
4	4.1(4)
5	3.24(2.5)/3.2(2.5)
6	2(1.84)/2(1.4)
7	1.54(1.7)/1.5(1.7)
8	0(0)
9	2.2(2.3)
10	5.17(5.2)
11	0.63(0.63)
12	2.85(2.8)
13	2(2)
14	3.5(3.52)/ 3.52(3.52)
15	3.76(0.65)
16	1.62(0)
17	3.52(3)
18	3.5(3.5)
19	3.5(3.5)
20	3.07(3)
21	2.72(2.6)
22	4.16(4.3)
23	0.57(2.9)
24	3.3(2.3)
25	3.76(2.39)/
26	4.21(2.12)
27	3.98(4)
28	3.39(3.63)
29	3.54(4.04)
30	4(3.6)

Voltage and Location of Transistors
V: PLAY, (V): REC

Symbol No.	Voltage (Unit:V)			Function	Location
	E	C	B		
TA46	2.3(2.3)	5.2(5.2)	3(3)	Buffer	D-4*
TC48	0(0)	0(0)	0(0)	Switch	E-3*
TF02	1.05(0)	11.46(0.95)	0(0)	Equalizer	E-6*
TF06	1.76(0)	0.98(9.8)	2.35(0)	Equalizer	E-6*
TF09	0.28(0.97)	2.3(0)	0.8(9.6)	Equalizer	E-5*
TF16	0(0)	0(0)	0(0)		F-7*
TF26	9.38(0.42)	11.76(0.96)	10(0.96)	9V	
TF30	0(2.7)	9.38(0.42)	3.4(0.06)	Buffer	F-4*
TF33	1.9(0)	9.38(0.42)	0(2.6)	Buffer	F-5*
TF41	0(6.88)	0(1.83)	0(0.63)	Buffer	E-5*
TF45	0(1.37)	0(4.87)	0(2.02)	Record amplifier	E-6*
TN01	2.7(2.65)	0(0)	2.1(2.0)	Buffer	D-6*
TN03	0(0)	0(0)	0(0.7)	Switch	F-5*
TN28	0(0)	4.9(4.9)	0(0)	Amplifier	G-5*
TJ01				AM sound modulator	
TS57#					C-8*
TI10	0(1.58)	0(0)	0(2.26)		F-10*
TV03	0.86(0)	9.23(0.96)	1.5(0.1)	Amplifier	D-2*
TV08	8.58(0.4)	11.76(0.96)	9.23(0.96)	Buffer	D-2*
TV14	4.06(1.9)	11.76(0.95)	4.08(0.38)	Buffer	D-2*
TV17	4.06(1.9)	5.2(5.2)	2.5(2.5)	Buffer	D-2
TV25	4.73(0.38)	11.76(0.96)	5.3(1)	Buffer	D-2*
TV26	1.29(1)	5.3(1)	1.9(1.73)	Amplifier	D-2*
TV31	0(0)	4(4)	0(0)		D-3*
TV45	1.54(2.47)	0(0)	1.8(0.88)	Switch	E-2*
TV53	0(0)	3.04(3)	0(0)	Switch	E-3*
TV60	0(0)	0(0)	0.65(0.08)	Switch	C-3*
TV85	0(0)	2.86(0)	0(0)	Switch	F-5*
TV86	0(0)	0(0)	0.68(0.3)	Switch	G-5*
TW03	1.86(1.86)	0(0)	1.19(1.19)	Buffer	D-8*
TW07	0(0)	–	–	Buffer	D-8*
TW11	0(4.5)	11.7(11.6)	0(5.18)	Buffer	G-9*
TW14	0.65(1.96)	0(0)	0(1.35)	Buffer	G-8*
TW23	0(0)	0(0)	4.45(4.45)	PAL switch	G-8*
TW44	5.16(5.2)	11.8(11.68)	5.8(5.82)	Switch	F-7*
TW51	1.73(1.73)	2.3(2.3)	(2.3)2.3	Buffer	D-5*
TW56	5.8(5.8)	11.8(11.8)	6.4(6.4)	Amplifer	C-3*
TW65	2.5(2.5)	11.75(11.7)	3.19(3.18)	Buffer	D-7*
TW87	11.8(11.8)	11.8(0.06)	11(11.78)	Buffer	D-5*
TW89	0(0)	0.04(11.7)	0.69(0)		E-7*
TW92	0.63(0.63)	0(0)	0(0)		E-7*
TX05	5.29(5.29)	0(0)	5.28(5.28)		D-6*
TX11	11.8(11.8)	11.78(1)	11(11.7)		E-4
TX12	0(0)	0.1(11.7)	0.7(0)	Switch	F-8*
TX16	0(0)	11.7(0.1)	0(0.7)	12V switch	F-7*
TX17	11.8(11.8)	0(11.78)	11.78(11)	Switch	E-4
TX26	5.3(5.32)	5.29(5.29)	4.59(4.59)	Power switch	E-4
TX27	0(0)	–	0.74(0.75)	Power switch	E-8*
TX28	11.76(11.78)	11.76(11.73)	11.05(11)	Power switch	E-4
TX44	4.65(4.3)	11.74(4.3)	5.28(4.92)	Buffer	D-9*
TX45	11.78(11.7)	0(11.5)	11.7(11)	Power ON/OFF	D-10*

Location of Adjusting VR

Symbol No.	Location
CV48	E-10
PA44	D-8
PF01	E-6
PF33	E-8
PF41	E-7
PI40#	F-2
PN19	F-7
PN21	F-6
PN24	F-6
PN39	G-6
PN44	F-7
PS40	C-4
PV57	E-11

Location of Diodes

Symbol No.	Location
DF30	F-4*
DF31	F-4*
DF34	F-3*
DN44	G-5*
DS63	C-9*
DV55	C-3*
DV58	E-2*
DV69	D-2*
DV71	C-2*
DW26	E-5
DW27	E-8*
DW30	E-4
DW86	D-5*
DW92	D-7*
DW94	D-5*
DW98	D-6*
DX22	E-9*

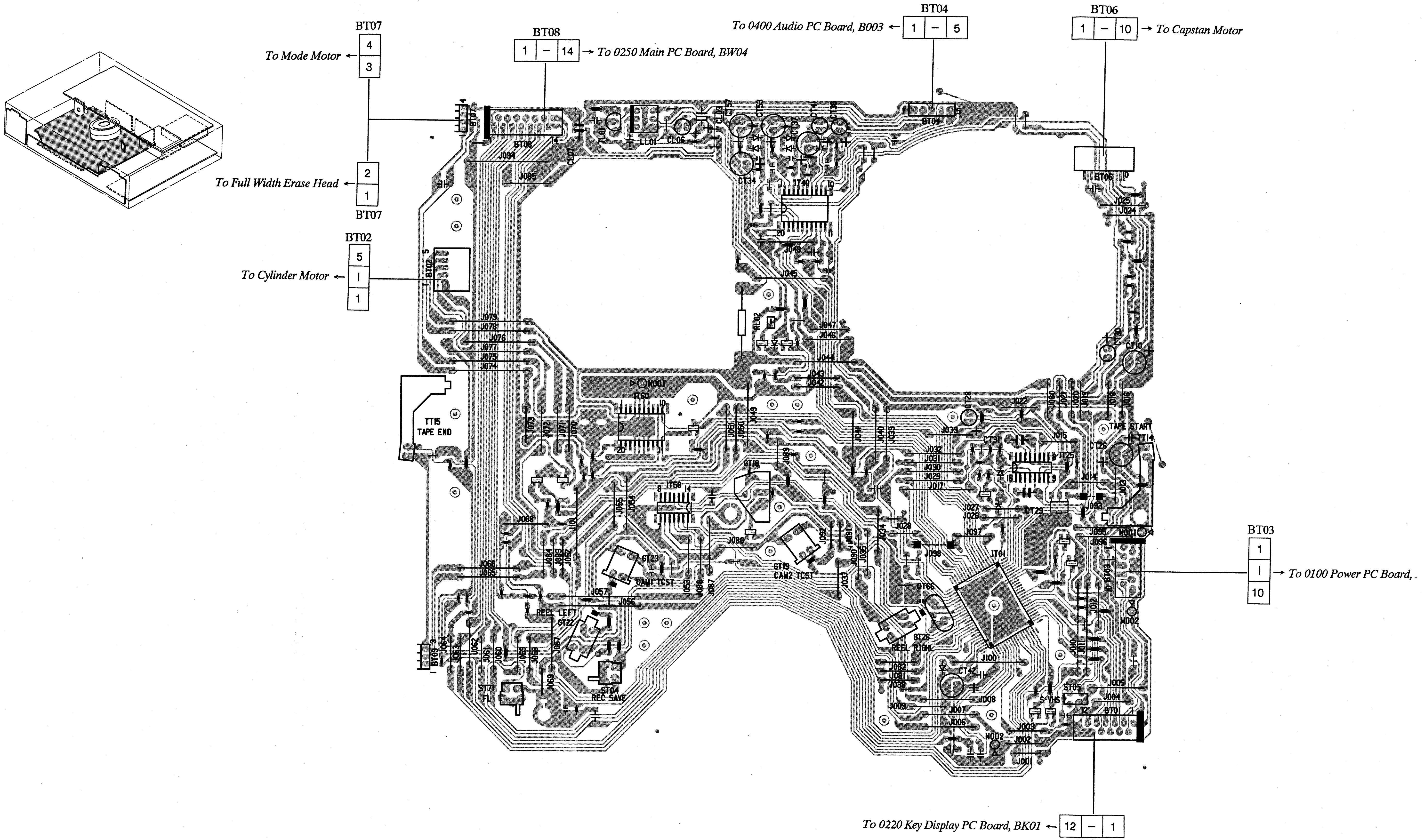
Difference voltage list for V-312G, 322GS
For the other voltage described below, the voltage of each transistors is same as V-312T.
TransistorsV: PLAY, (V): REC

Symbol No.	Voltage (Unit:V)			Function	Location
	E	C	B		
TF02	1.05(0)	11.46(0.85)	0(0)	Equalizer	E-6*
TF09	–(–)	2.3(0)	9.6(0.8)	Equalizer	E-5*
TF30	2.7(0)	9.38(0.42)	3.4(0)	Buffer	F-4*
TF33	–	9.38(0.42)	–	Buffer	F-5*
TF41	–	–	–	Buffer	E-5*
TI10	0(1.59)	0(0)	2.27(0)		F-10*
TN03	0(0)	0(0)	0(0)	Switch	F-5*
TN28	0(0)	4.09(4.09)	0(0)	Amplifier	G-5*
TV14	4.68(0.38)	11.76(0.95)	–	Buffer	D-2*
TV17	4.06(1.91)	5.2(5.2)	2.5(2.5)	Buffer	D-2
TV53	0(0)	3(3)	0(0)	Switch	E-3*
TV60	0(0)	0(0)	0.65(0)	Switch	C-3*
TW03	1.88(1.8)	0(0)	1.19(1.18)	Buffer	D-8*
TW07	0(0)	0(0)	4.36(4.36)	Buffer	G-9*
TW11	0(2.68)	11.7(11.57)	0(3.3)	Buffer	G-8*
TW14	0.65(1.42)	0(0)	0(0.78)	Buffer	G-8*
TW23	0(0)	0(0)	4.36(4.36)	PAL switch	G-8*
TW44	5.16(5.2)	11.6(11.68)	5.8(5.82)	Switch	F-7*
TW51	1.73(1.73)	11.6(11.67)	2.3(2.3)	Buffer	D-5*
TW65	2.5(2.5)	11.7(11.75)	3.19(3.18)	Buffer	D-7*
TW92	0(0)	0(0)	0(0)	Buffer	E-7*
TX05	5.2(5.2)	0(0)	5.2(5.2)	Buffer	D-6*
TX11	11.8(11.8)	11.7(0.96)	11(11.7)		E-4
TX12	0(0)	11(11.7)	0.1(11.7)	Switch	F-8*
TX26	5.3(5.3)	5.29(5.29)	4.59(4.59)	Power switch	E-4
TX27	0(0)	0.59(0.6)	0.74(0.75)	Power switch	E-8*
TX28	11.76(11.78)	11.76(11.73)	–(–)	Power switch	E-4
TX44	4.8(4.8)	11.7(4.4)	5.2(4.9)	Buffer	D-9*
TX45	11.7(11.6)	0(11.5)	11.74(10.8)	Power ON/OFF	D-10*

Location of IC

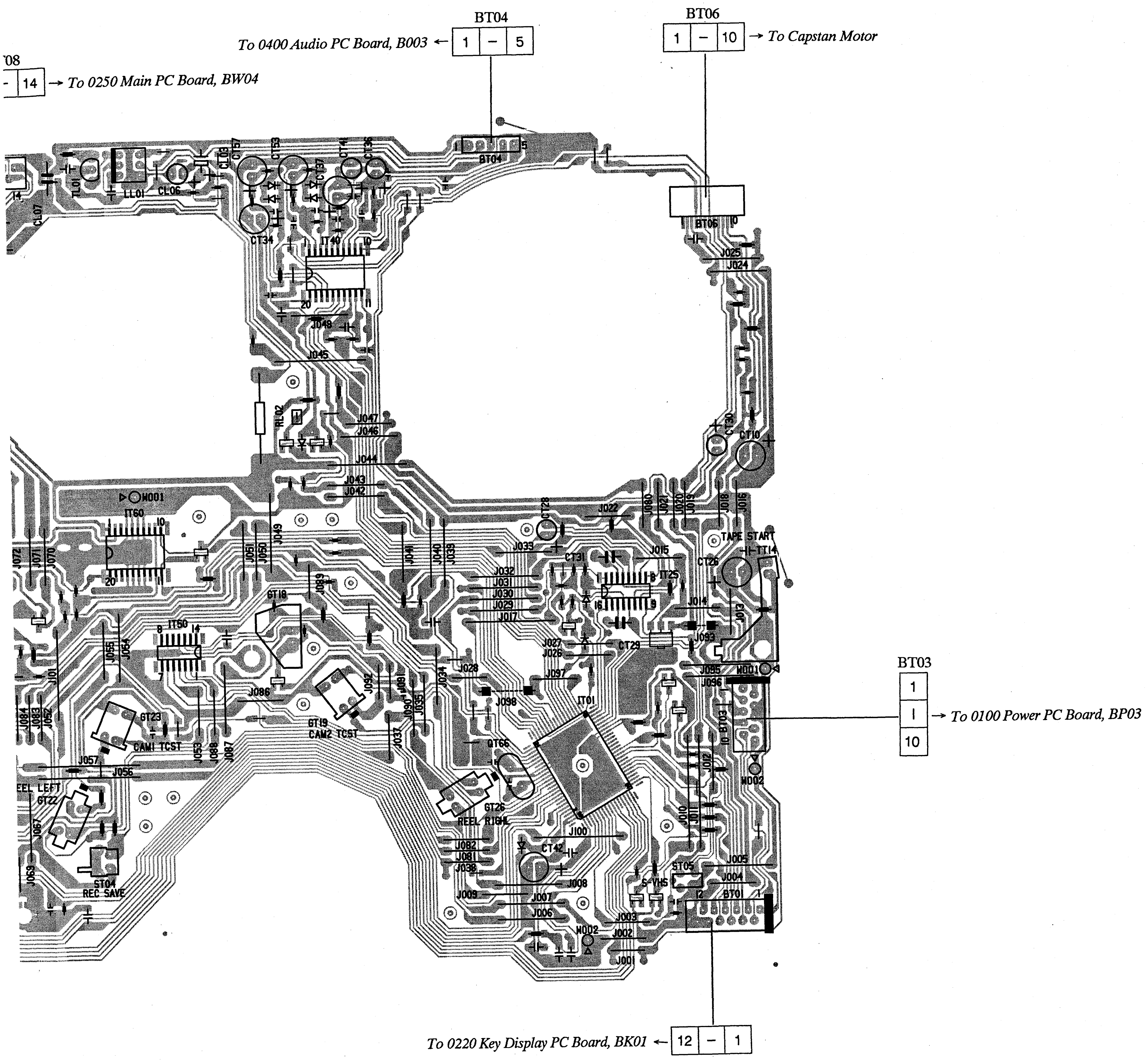
Symbol No.	Function	Location
IA01	MUTE IC	D-7
IA40	OSD IC	D-8
IC01	SECAM processor	
IC20	SECAM burst processor	
IF21		F-8
II40	VIDEO IF	CF-2
II50	AUDIO IF	G-3
IJ01		
IN01	LUMA processor	F-7
IN15		F-3*
IN16		F-4*
IS50	IC modulator	C-4
IV40	PAL color processor	D-11
IV70	PAL/SECAM detector	C-11
IV80	PAL/SECAM switch	
IW20	Shift register	D-7*
IW25	Shift register	D-8*
IW28		D-6*
IW31		E-9*
IW35	AUDIO decoder	F-5
IW65		D-6*
IW85	Shift register	F-7*

9-3. Logic/Servo PC Board


BT07
4
3
To Mode Motor
2
1
To Full Width Erase Head
BT07
BT08
1 – 14
To 0250 Main PC Board, BW04
BT02
5
1
To Cylinder Motor
BT04
To 0400 Audio PC Board, B003
1 – 5
BT06
1 – 10
To Capstan Motor
BT03
1
10
To 0100 Power PC Board,.
To 0220 Key Display PC Board, BK01
12 – 1
BT01
TT15 TAPE END
TAPE START TT14
IT60
IT50
IT40
IT25
IT01
QT66
GT18
GT19 CAM2 TCST
GT23 CAM1 TCST
GT22 REEL LEFT
GT26 REEL RIGHT
ST71 FL
ST04 REC SAVE
ST05 S-VHS
M001
M002
LL01
CL06
CL07
CT34
CT53
CT57
CT41
CT36
CT37
CT28
CT31
CT26
CT29
CT30
CT10
CT42
RL02
BT09
J094
J085

0220 Logic/Servo PC Board (Top Side)

6 7 8 9 10 11 12 13 14 15 16


BT04
To 0400 Audio PC Board, B003 ← 1 – 5
BT06
1 – 10 → To Capstan Motor
'08
- 14 → To 0250 Main PC Board, BW04
BT03
1
I
10
→ To 0100 Power PC Board, BP03
To 0220 Key Display PC Board, BK01 ← 12 – 1
BT01
IT01
IT25
IT40
IT50
IT60
GT18
GT19
GT22
GT23
GT26
CAM1 TCST
CAM2 TCST
EEL LEFT
REEL RIGHT
ST04
REC SAVE
ST05
S-VHS
TAPE START
TT14
CT10
CT26
CT28
CT29
CT30
CT31
CT34
CT41
CT42
CL06
CL07
LL01
TL01
RL02
HD01
HD02
QT66

0220 Logic/Servo PC Board (Top Side)

Location of Diodes

Symbol No.	Location
DT30	F-4*
DT31	E-4*
DT32	E-4*
DT51	B-5*
DT52	B-5*
DT54	B-6*
DT56	B-6*
DT58	C-5*
GT18	D-7
GT19	E-7
GT22	F-5
GT23	E-6
GT26	F-8

Location of ICs

Symbol No.	Function	Location
IT01	Servo processor	E-9
IT25	Capstan and cylinder regulator	D-9
IT40	Control head	B-7
IT50	Motor IC loading	E-6
IT60	Inverter	D-6

Voltage of ICs

IT40

Pin No.	Voltage (Unit: V)
1	2.5(2.5)
2	2.5(2.5)
3	–(–)
4	2(2)
5	2(2)
6	2(2)
7	2.7(2)
8	1.7(2)
9	–(–)
10	2.45(2.45)
11	0()
12	0(4.8)
13	–(–)
14	0(0)
15	0(0)
16	0(0)
17	–(–)
18	2.47(2.45)
19	4.86(4.86)
20	2.47(2.47)

IT25

Pin No.	Voltage (Unit: V)
1	–(–)
2	–(–)
3	1.82(1.8)
4	–(–)
5	1.9(1.9)
6	–(–)
7	–(–)
8	4.94(4.95)
9	
10	4.94(4.94)
11	5.69(5.69)
12	–(–)
13	2.84(2.84)
14	0(0)
15	1.82(1.82)
16	1.67(1.67)

IT60

Pin No.	Voltage (Unit: V)
1	–(–)
2	0(0)
3	0(0)
4	0(0)
5	0(0)
6	0(0)
7	0(0)
8	2.7(2.7)
9	0(–)
10	–(–)
11	0(0)
12	0(0)
13	2.7(2.7)
14	0(0)
15	0(0)
16	0(0)
17	0(0)
18	0(0)
19	0(0)
20	0(0)

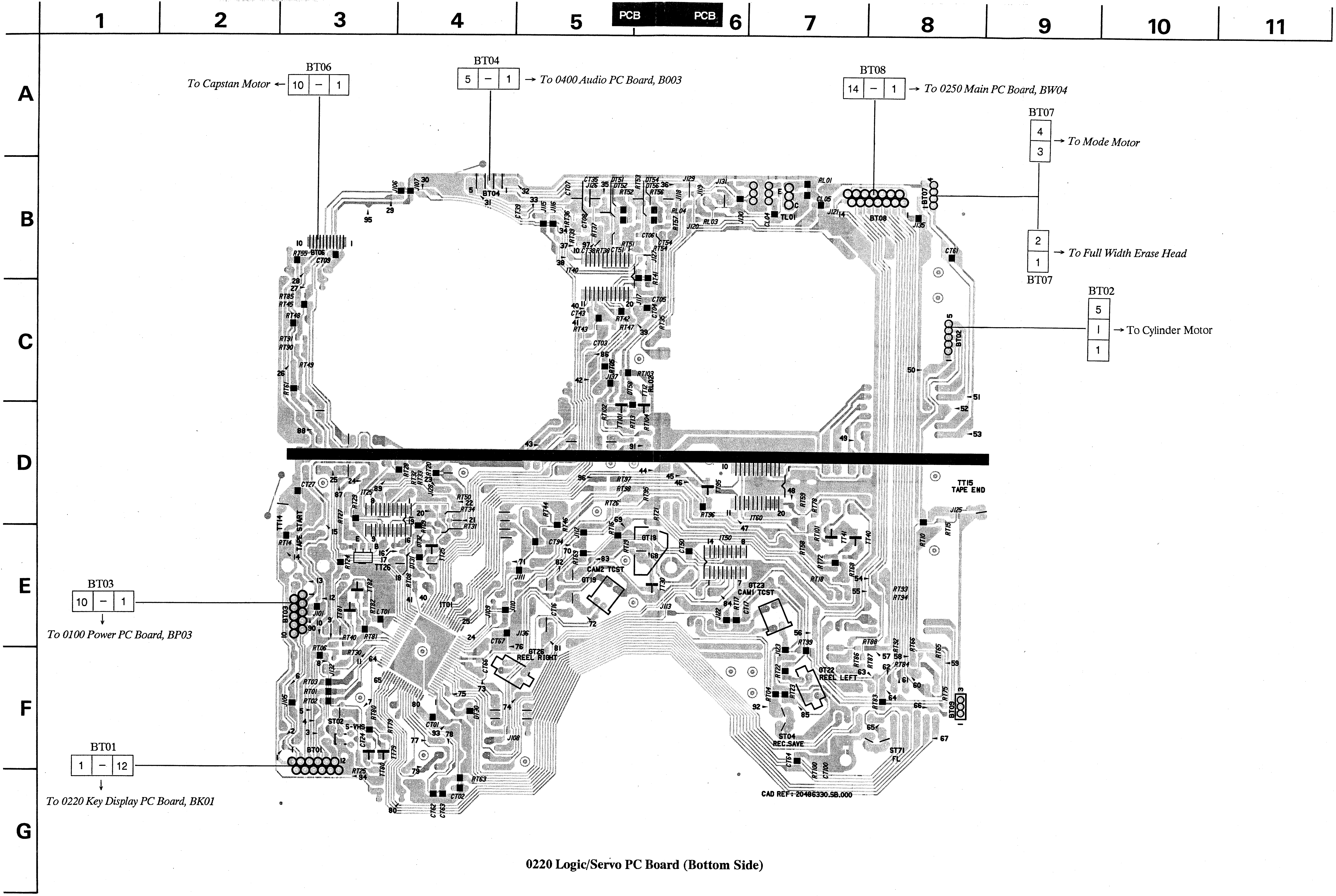
IT50

Pin No.	Voltage (Unit: V)
1	0(4.96)
2	4.95(0)
3	–(–)
4	–(–)
5	0(4.96)
6	4.96(0)
7	0(0)
8	4.96(4.96)
9	0(–)
10	4.96(4.96)
11	0(–)
12	4.95(0)
13	0(4.96)
14	4.96(4.96)

Voltage and Location of Transistors

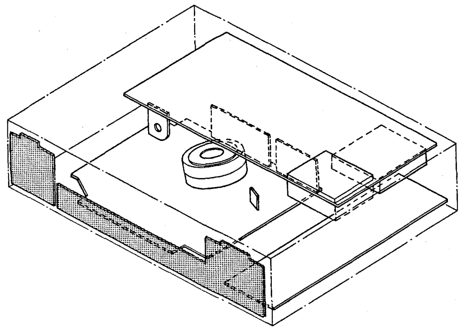
V: PLAY, (V): REC

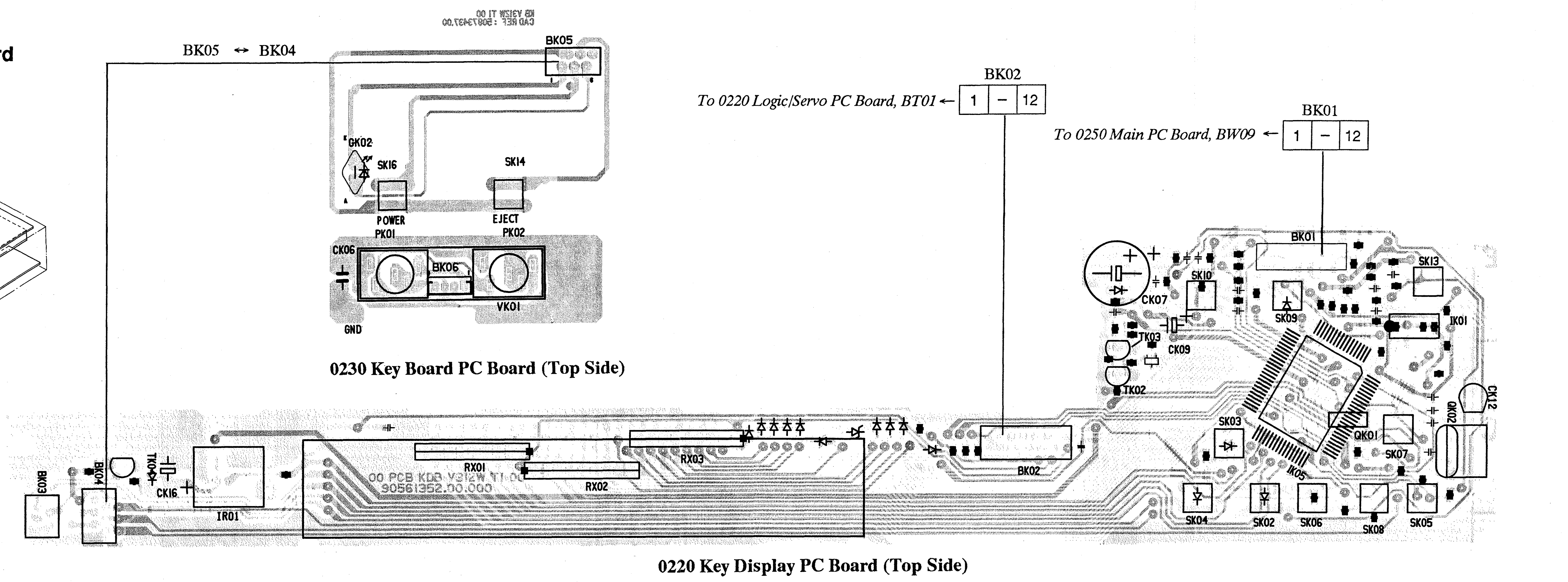
Symbol No.	Voltage (Unit:V)			Function	Location
	E	C	B		
TL01	0.9(0.3)	21.3(–)	12(0.3)	Bias oscillator	B-6
TT12	0(0)	0(7.4)	0.7(0.7)	Erase control	C-6*
TT14					D-10
TT15					D-4
TT25	0(0)	1.66(1.66)	0(0)	Cylinder drive capstan select regulator	E-4*
TT26	4.96(4.96)	6.6(6.6)	5.7(5.7)	5V regulator	D-3*
TT30	0(0)	0.18(0.18)	0.78(0.77)	Driver (Dew heater)	E-6*
TT40	4.95(4.95)	0(0)	4.92(4.89)	Driver	E-8*
TT41	0(0)	14.58(14.54)	0	Driver	E-7*
TT79	0(0)	22(22)	0(0)		F-4*
TT80	0(0)	14.1(14.1)	0(0)		F-3*
TT81	4.96(4.96)	4.94(4.94)	4.26(4.26)	Reset	E-3*
TT82	4.95(4.95)	0(0)	4.96(4.96)	Stop	E-3*
TT95	0(0)	0	4.34(4.3)	Reset motor	D-6*
TT101				Prevent initial erase of first power ON	D-5*


1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
BT06
To Capstan Motor ← 10 – 1
BT04
5 – 1 → To 0400 Audio PC Board, B003
BT08
14 – 1 → To 0250 Main PC Board, BW04
BT07
4
3
→ To Mode Motor
2
1
→ To Full Width Erase Head
BT07
BT02
5
|
1
→ To Cylinder Motor
BT03
10 – 1
To 0100 Power PC Board, BP03
BT01
1 – 12
To 0220 Key Display PC Board, BK01
TT15 TAPE END
TT14 TAPE START
CAM2 TCST
CAM1 TCST
BT26 REEL RIGHT
BT22 REEL LEFT
ST02 S-VHS
ST04 REC.SAVE
ST71 FL
CAD REF: 20486330.SB.000

0220 Logic/Servo PC Board (Bottom Side)

9-4. Key Display PC Board

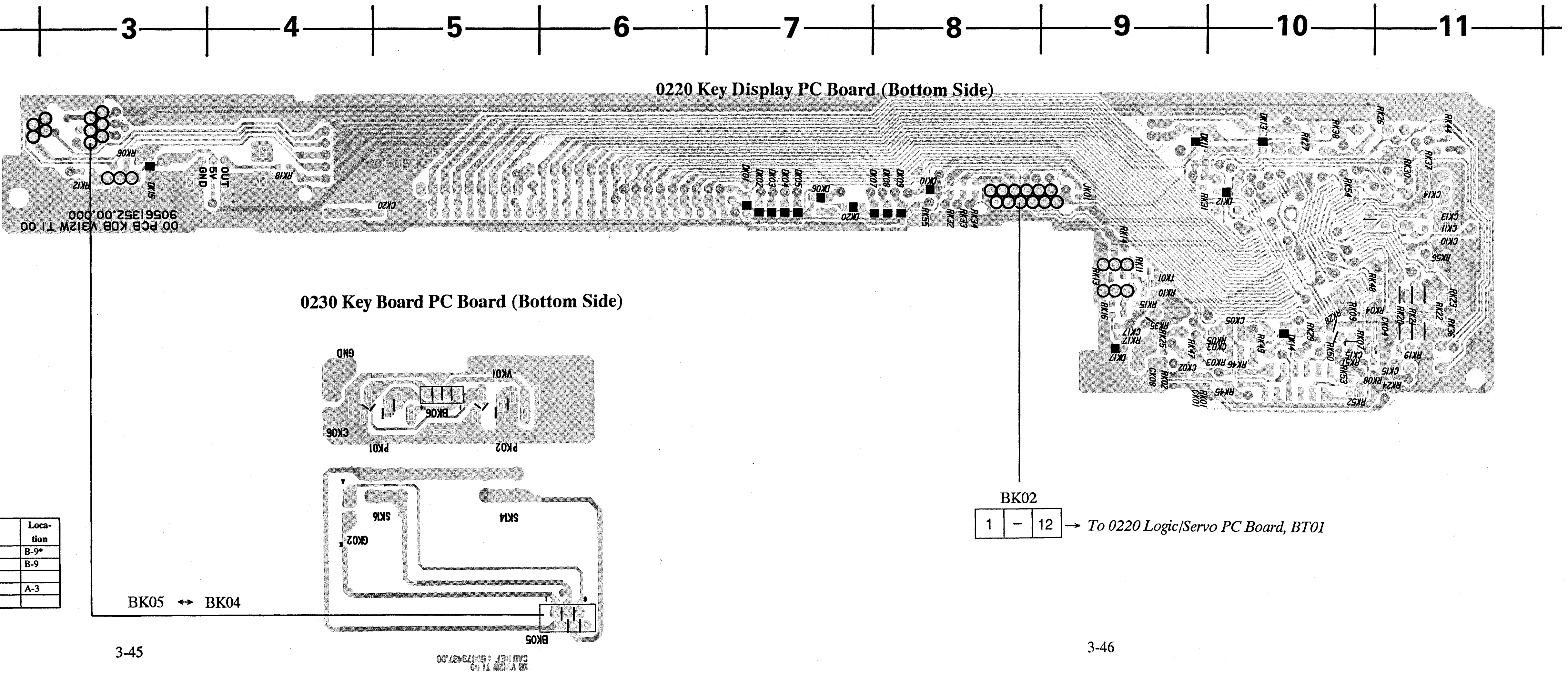



BK05 ↔ BK04
BK05
GK02
SK16
SK14
POWER
PK01
EJECT
PK02
CK06
BK06
VK01
GND
BK02
To 0220 Logic/Servo PC Board, BT01 ← 1 – 12
BK01
To 0250 Main PC Board, BW09 ← 1 – 12
SK10
SK13
CK07
SK09
IK01
TK03
CK09
TK02
CK12
QK02
SK03
QK01
SK07
IK05
SK04
SK02
SK06
SK08
SK05
RX01
RX02
RX03
IR01
CK16
TK04
BK04
BK03
00 PCB KDB V312W T1 00
90561352.00.000

0230 Key Board PC Board (Top Side)

0220 Key Display PC Board (Top Side)

0220 Key Display PC Board (Bottom Side)


1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
GND
5V
OUT
DK01
DK02
DK03
DK04
DK05
DK06
DK07
DK08
DK09
DK10
DK20
RX35
RX32
RX33
RX34
BK02
1 – 12 → To 0220 Logic/Servo PC Board, BT01
GND
VK01
BK06
CK06
PK01
PK02
SK16
SK14
GK02
BK05
BK05 ↔ BK04

0230 Key Board PC Board (Bottom Side)

Location of Diodes

Symbol No.	Location
DK01	A-7*
DK02	A-7*
DK03	A-7*
DK04	A-7*
DK05	A-7*
DK06	B-7*
DK07	A-7*
DK08	A-8*
DK09	A-8*
DK10	A-8*
DK11	A-9*
DK12	B-10*
DK13	A-10*
DK14	B-10*
DK15	
DK17	B-9*
DK20	B-7*
GX02	

Location of IC

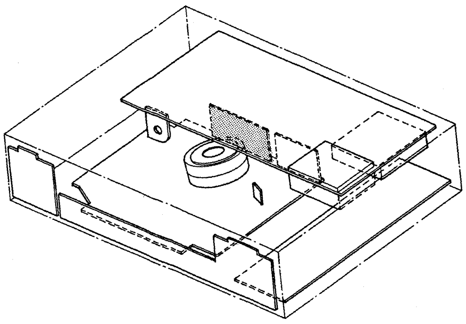
Symbol No.	Function	Location
IK01	KDBmicro-processor (TC8910P)	B-11
IK05		B-10

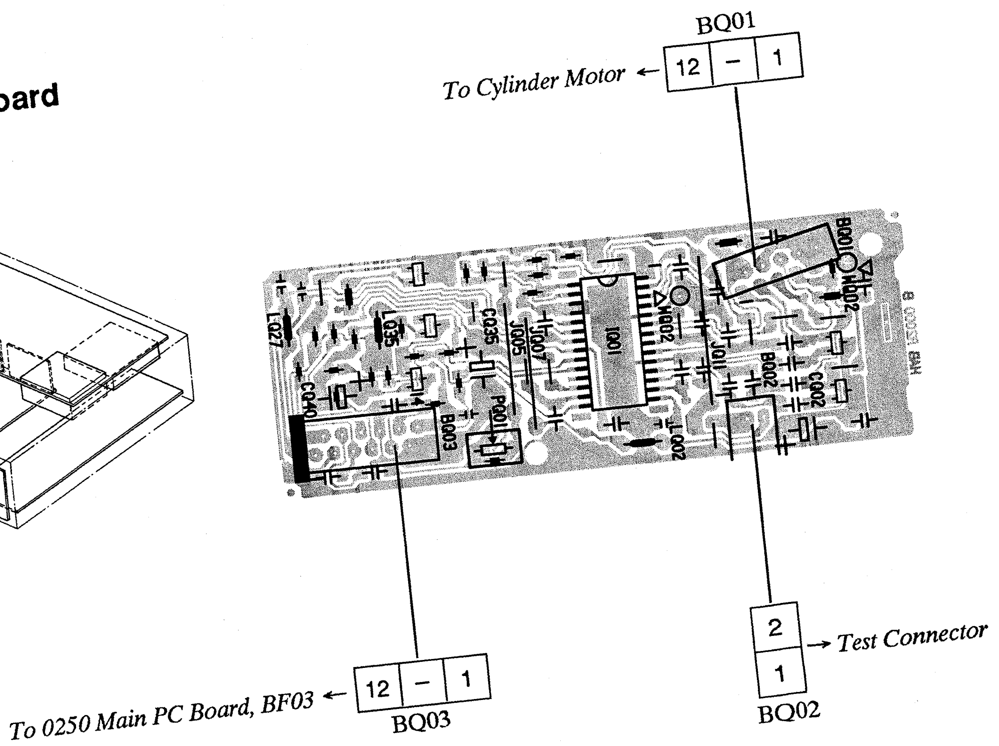
Voltage and Location of Transistors

V: REC, (V): PLAY

Symbol No.	Voltage (Unit:V)			Function	Location
	E	C	B		
TK01	5	5	4.25	Switch	B-9*
TK02	(0)	0	0.62	Switch	B-9
TK03				Switch	
TK04	5	5	4.74	LED driver	A-3
TK09	(0)	(5)	(0)		

9-5. Pre Amp PC Board




BQ01
To Cylinder Motor
12 – 1
To 0250 Main PC Board, BF03
12 – 1
BQ03
2
1
Test Connector
BQ02
L027
L035
C035
C040
J005
J007
BQ03
PQ01
IQ01
MQ02
J011
BQ02
C002
J002
BQ01
MQ02

0800 Pre Amp PC Board (Top Side)

Voltage of IC

IQ01

Pin No.	Voltage (Unit: V)
1	0(0)
2	3.4(2.6)
3	3.4(2.6)
4	0(0.5)
5	0
6	0(0.5)
7	10(0)
8	10.4(0)
9	0(0.5)
10	0(0)
11	0(0.5)
12	3.4(2.7)
13	3.4(2.7)
14	0.93(3)
15	0.36(2.4)
16	5(5)
17	2.4(1.5)
18	–(–)
19	3(1.5)
20	2.6(2.5)
21	0(0)
22	2(2)
23	4.7(4.7)
24	11(0)
25	0(0)
26	0(0)
27	0(0)
28	0.35(0)

Location of IC

Symbol No.	Function	Location
IQ01	HAB processor (TEA-5706)	C-4

Location of Adjusting VR

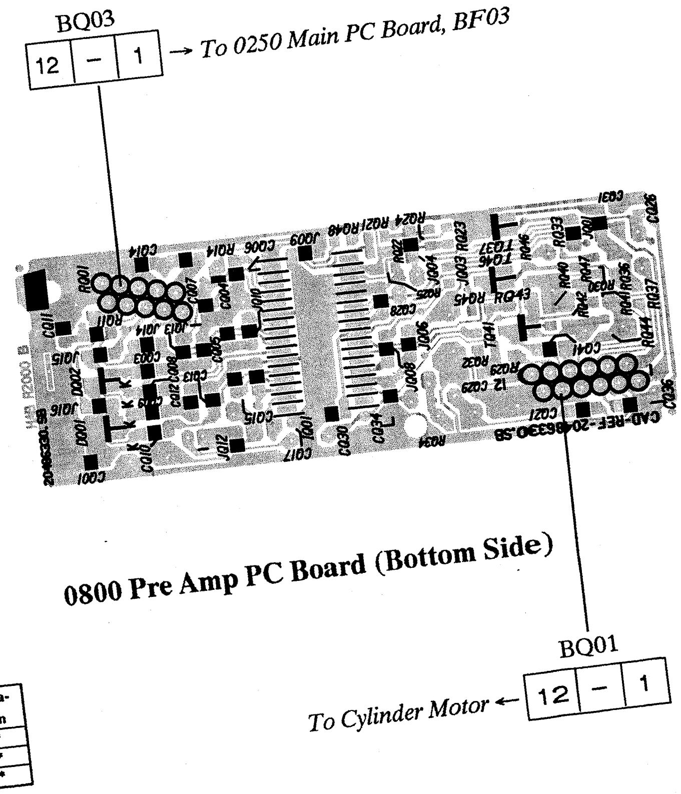
Symbol No.	Location
PQ01	B-4

Location of Diodes

Symbol No.	Location
DQ01	C-3*
DQ02	B-3*

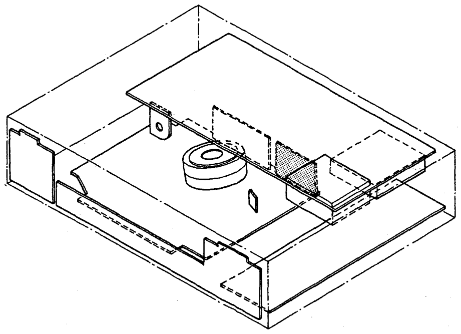
Voltage and Location of Transistors
V: REC, (V): PLAY

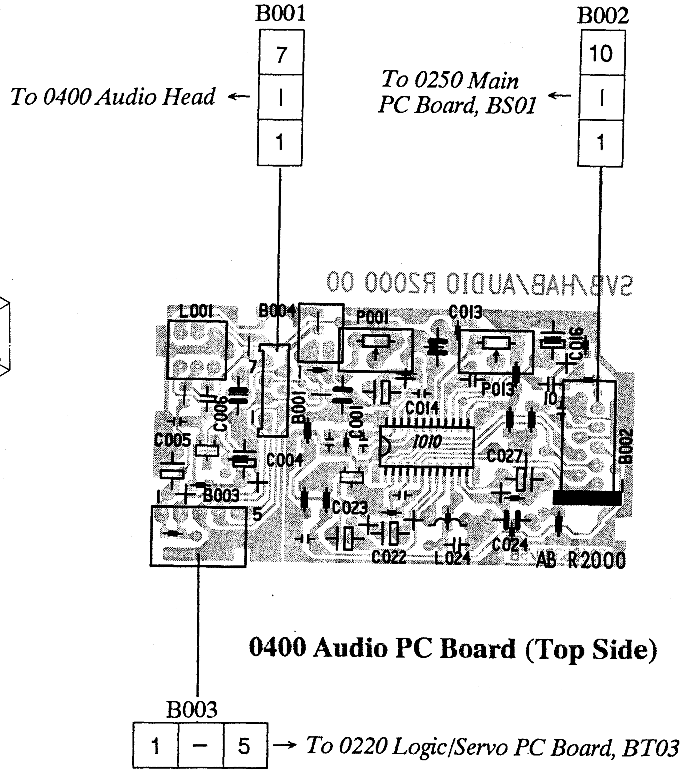
Symbol No.	Voltage (Unit:V)			Function	Location
	E	C	B		
TQ37	3.1(2)	0(0)	2.5(1.5)	Buffer	B-5*
TQ41	0.31(0.5)	0.31(0.8)	1.3(1)	Amplifier	B-5*
TQ46	0.36(2.3)	0.31(0.6)	1.63(1.7)	Lineariser	B-5*


BQ03
12 – 1
To 0250 Main PC Board, BF03
BQ01
To Cylinder Motor
12 – 1
CAD-REF-20496330.SB

0800 Pre Amp PC Board (Bottom Side)

9-6. Audio PC Board




B001
7
1
To 0400 Audio Head
B002
10
1
To 0250 Main PC Board, BS01
L001
B004
P001
C013
C016
P013
C014
I010
C027
C005
C006
C004
B003
C023
C022
L024
C024
AB R2000
B003
1 – 5
To 0220 Logic/Servo PC Board, BT03

0400 Audio PC Board (Top Side)

Location of IC

Symbol No.	Function	Location
I010	AUDIO processor	B-4

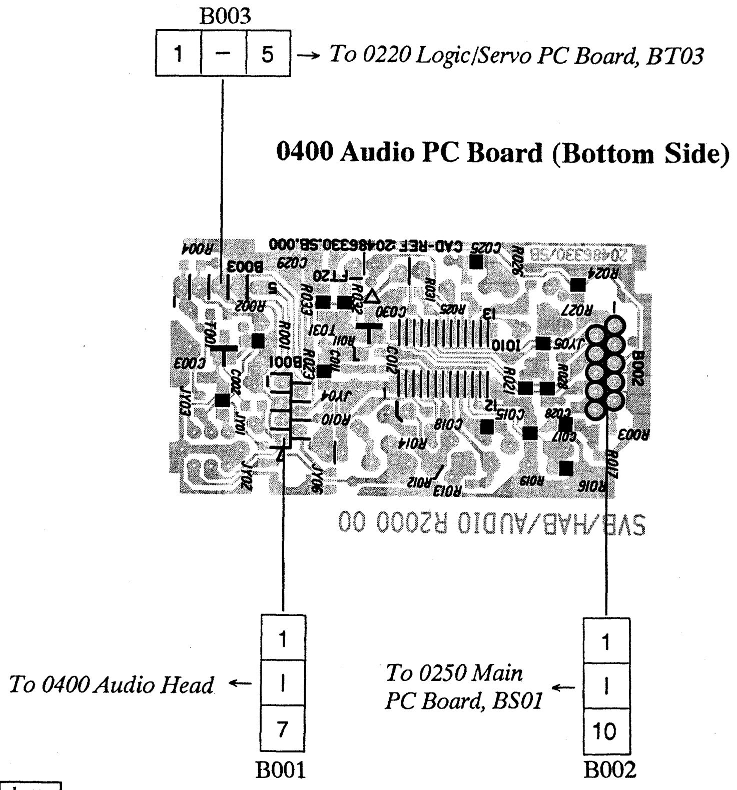
Voltage of IC

I010

Pin No.	Voltage (Unit: V)
1	4.8(0)
2	0(0)
3	0(0)
4	0(0)
5	0(0)
6	0.5(0.5)
7	0(0)
8	3.3(3.2)
9	4(3.3)
10	0(0)
11	4(3.3)
12	0(0)
13	4(4)
14	0(0)
15	0(0)
16	1(1.5)
17	4.2(4)
18	9.5(0.3)
19	12(6.3)
20	0(0)
21	0(0)
22	0(0)
23	5(0)
24	5.2(0)

Location of Adjusting VR

Symbol No.	Location
P001	C-4
P013	C-4


B003
1 – 5
To 0220 Logic/Servo PC Board, BT03
SVB/HAB/AUDIO R2000 00
B002
1
1
10
To 0250 Main PC Board, BS01
1
1
7
To 0400 Audio Head
B001

0400 Audio PC Board (Bottom Side)

Voltage and Location of Transistors

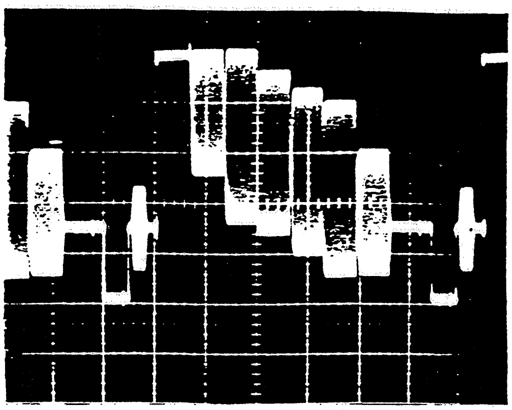
V: REC, (V): PLAY

Symbol No.	Voltage (Unit:V)			Function	Location
	E	C	B		
T031	0(0)	5(0)	0(0.65)	Switch	B-4*

10. WAVEFORM PICTURES

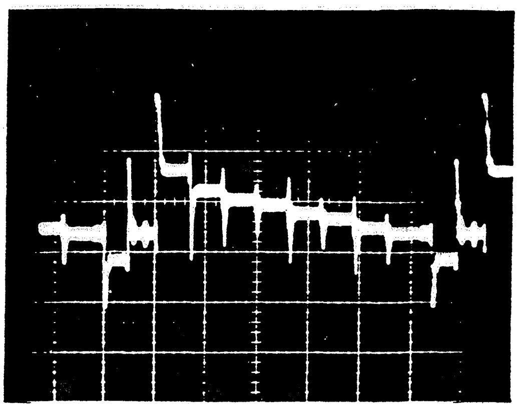
10-1. Main (Rec Mode)

① IN01, Pin ⑤



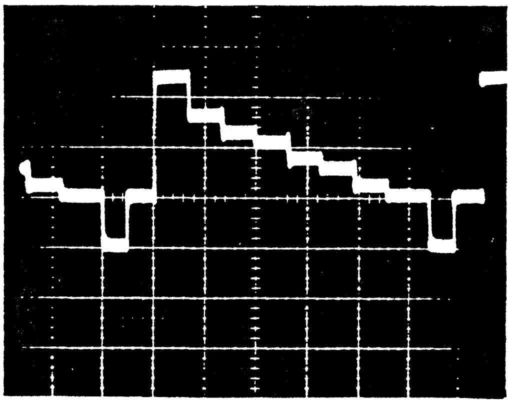
V: 0.2V/div.
H: 10μs/div.

③ IN01, Pin ㉕



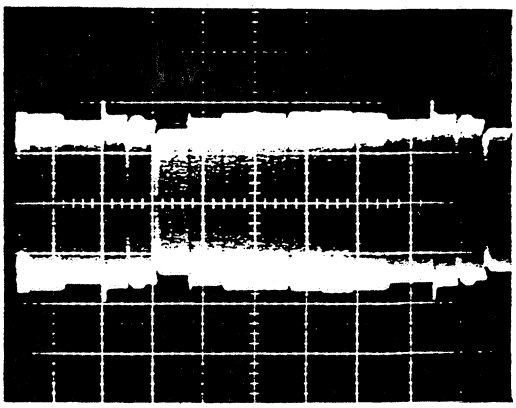
V: 0.2V/div.
H: 10μs/div.

② IN01, Pin ⑭



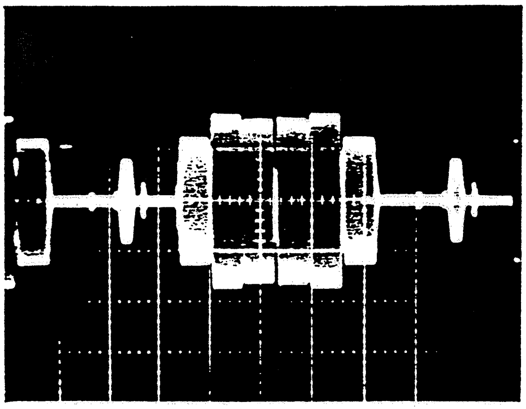
V: 0.1V/div.
H: 10μs/div.

④ BW16



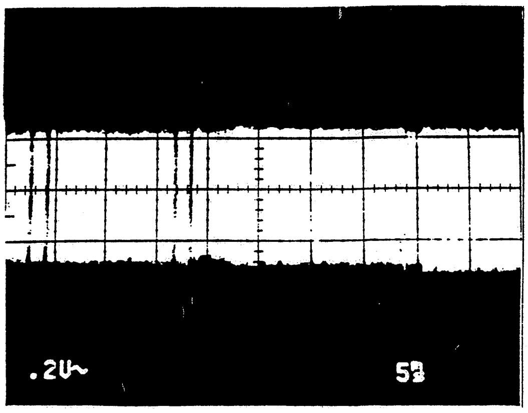
V: 0.2V/div.
H: 10μs/div.

⑤ IV40, Pin ⑩



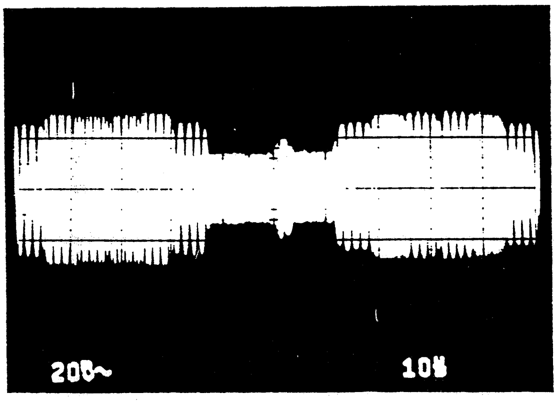
V: 0.2V/div.
H: 10μs/div.

⑦ BW14



V: 0.2V/div.
H: 5ms/div.

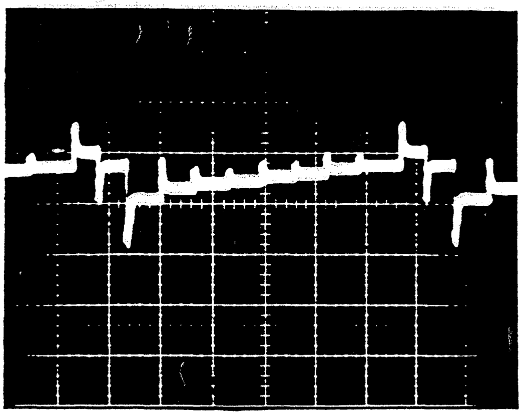
⑥ TV45, Emitter



V: 20mV/div.
H: 10μs/div.

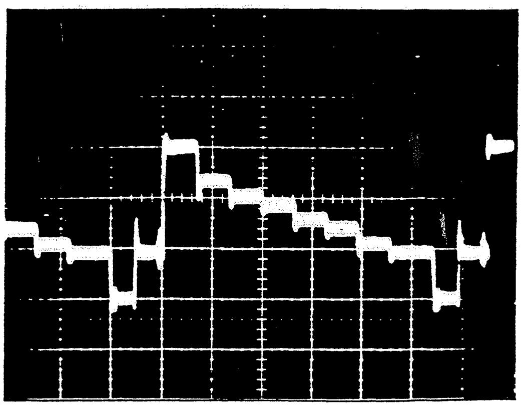
10-2. Main (Playback Mode)

⑧ IN01, Pin ⑭



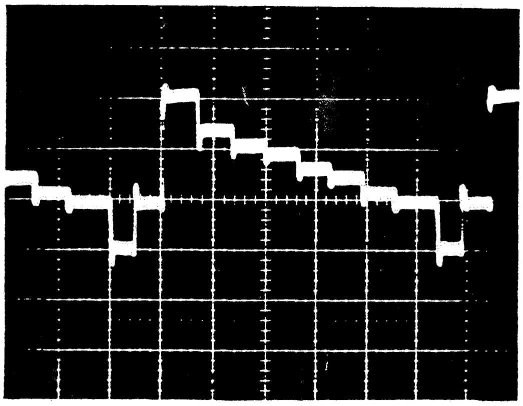
V: 0.1V/div.
H: 10µs/div.

⑩ IN01, Pin ⑲



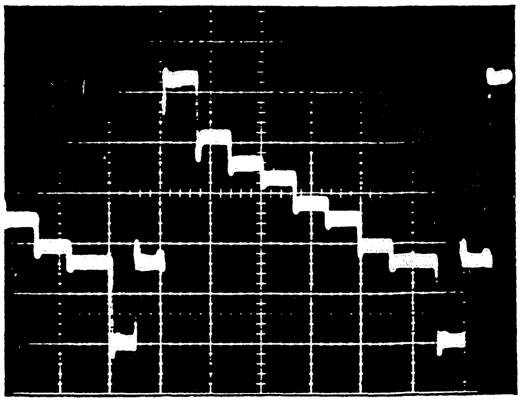
V: 0.1V/div.
H: 10µs/div.

⑨ IN01, Pin ⑱



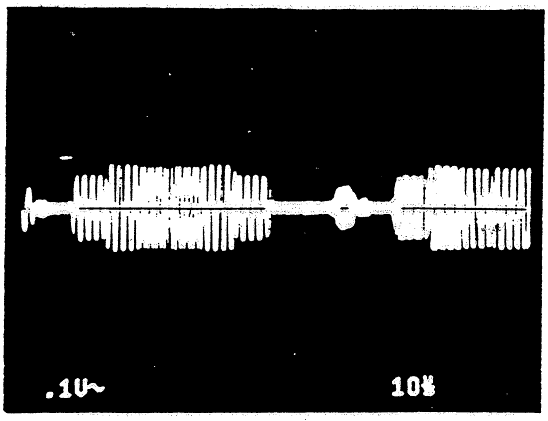
V: 0.1V/div.
H: 10µs/div.

⑪ IN01, Pin ㉑



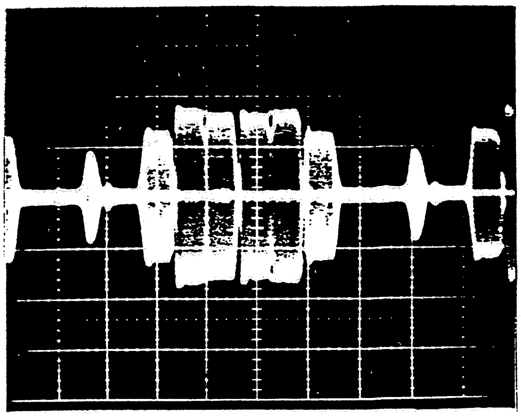
V: 0.2V/div.
H: 10µs/div.

⑫ IV40, Pin ⑮



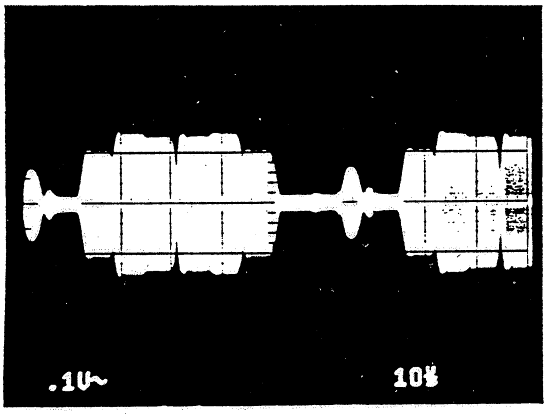
V: 0.1V/div.
H: 10µs/div.

⑮ IV40, Pin ⑫



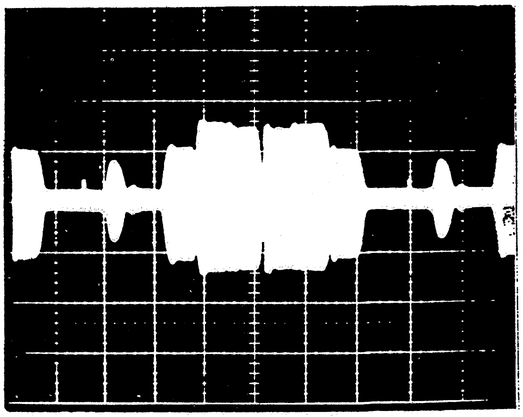
V: 0.2V/div.
H: 10µs/div.

⑬ IV40, Pin ⑬



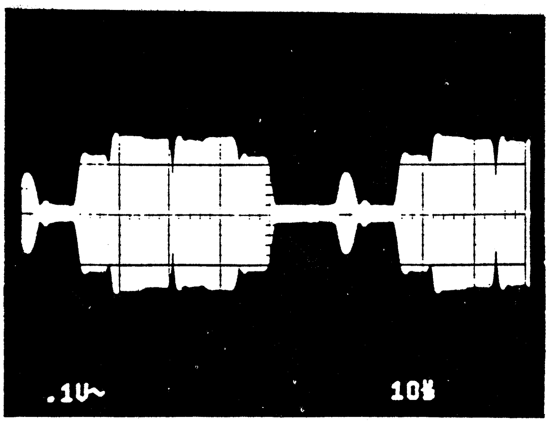
V: 0.1V/div.
H: 10µs/div.

⑯ IN01, Pin ⑫



V: 0.1V/div.
H: 10µs/div.

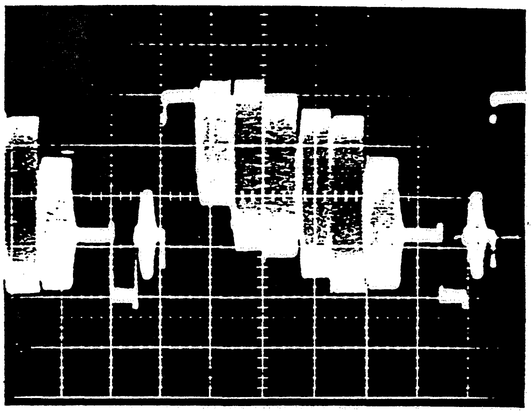
⑭ IV40, Pin ⑰



V: 0.1V/div.
H: 10µs/div.

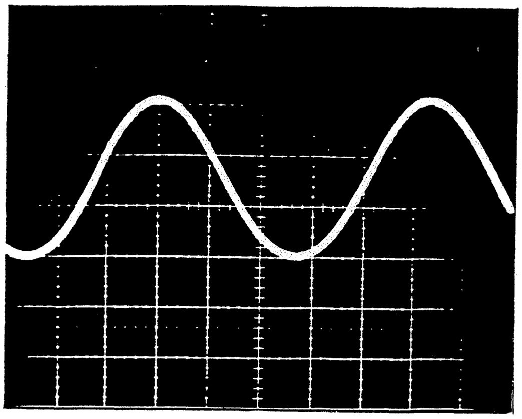
10-3. PIF Waveform

⑰ BW02



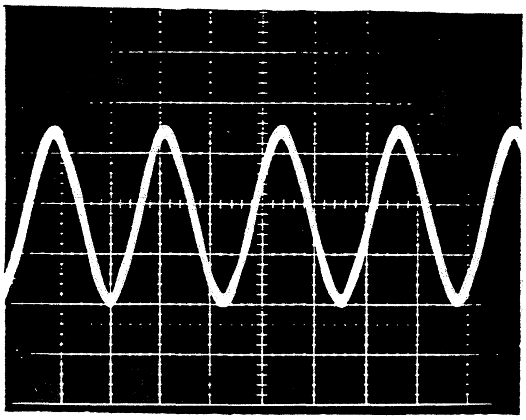
V: 0.5V/div.
H: 10µs/div.

⑳ T110, Collector



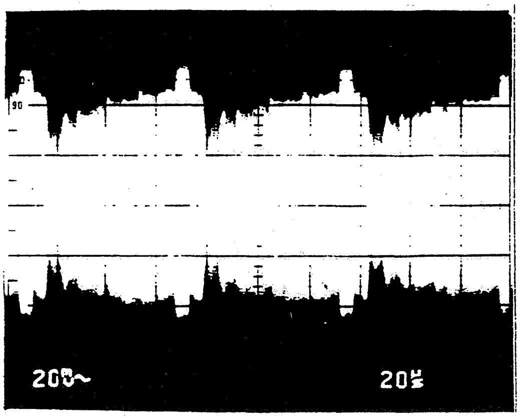
V: 20mV/div.
H: 20µs/div.

⑱ IV35, Pin ⑧



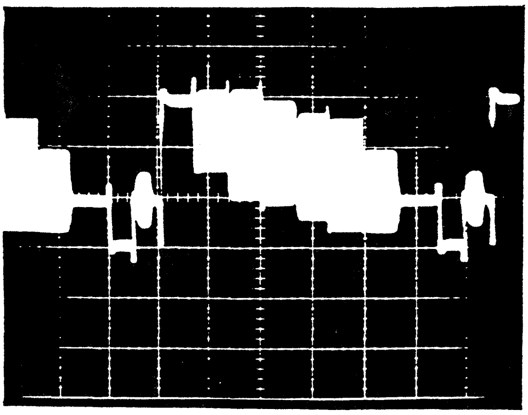
V: 0.5V/div.
H: 0.2ms/div.

㉑ TW11



V: 1V/div.
H: 10µs/div.

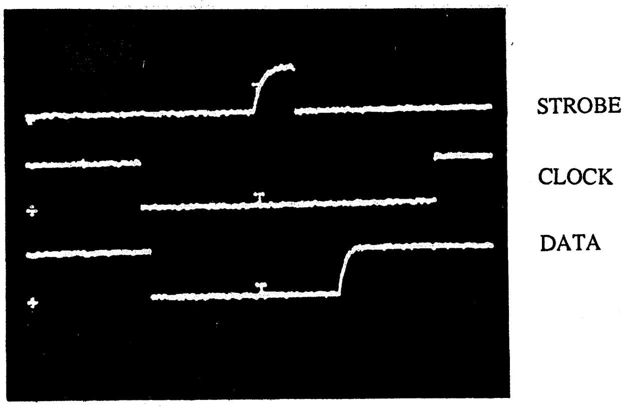
⑲ IV40, Pin ②



V: 0.2V/div.
H: 0.1µs/div.

10-4. Key Display Waveform

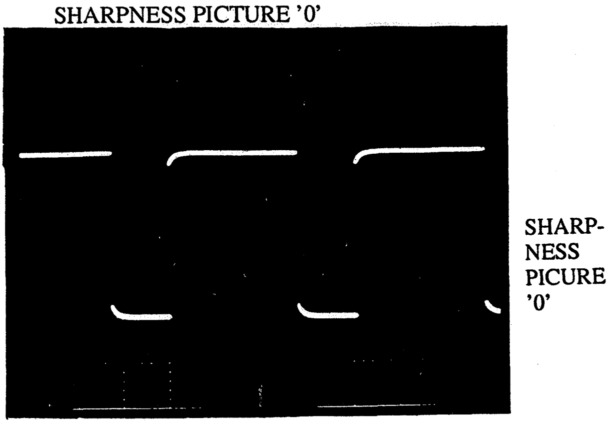
①



V: 0.5V/div.
H: 10µs/div.

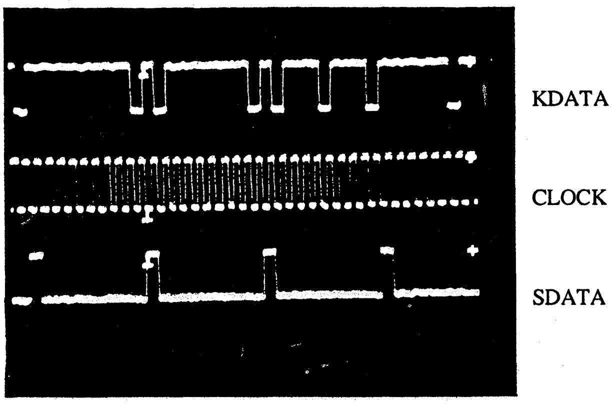
③

SHARPNESS PICTURE '0'



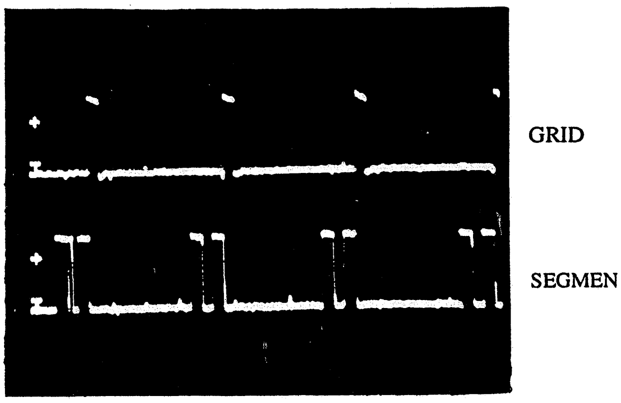
V: 1V/div.
H: 1ms/div.

②



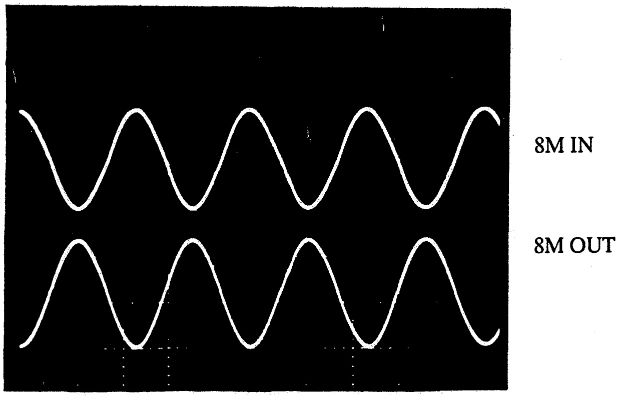
V: 5V/div.
H: 500µs/div.

④



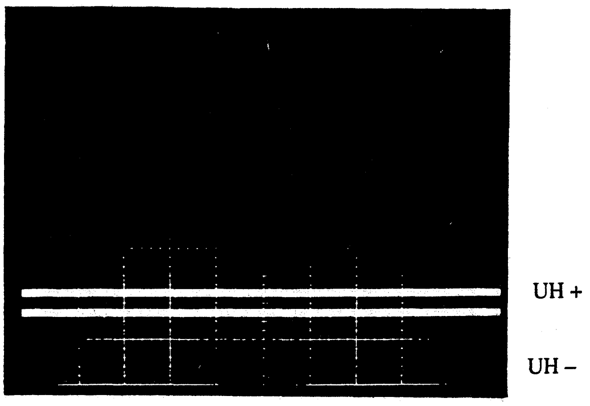
V: 20V/div.
H: 1ms/div.

⑤



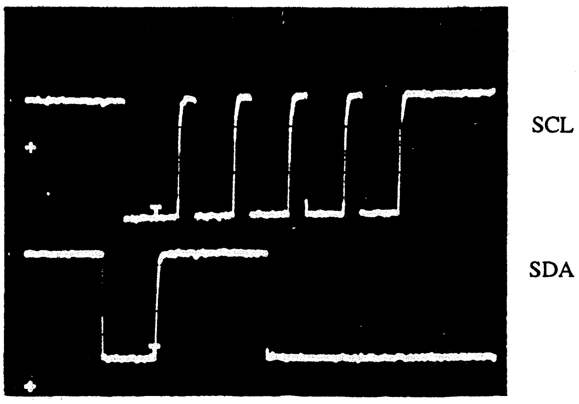
V: 2V/div.
H: 50ns/div.

⑥



V: 2V/div.
H: 20µs/div.

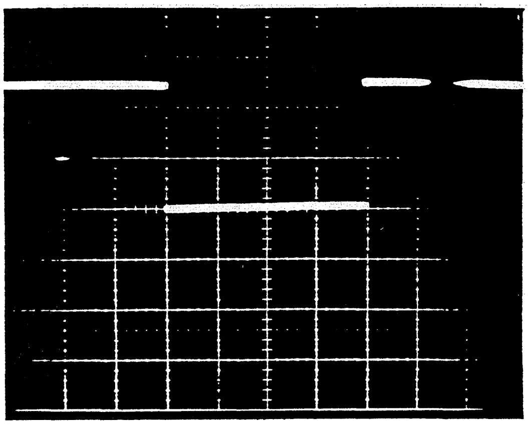
⑦



V: 2V/div.
H: 20µs/div.

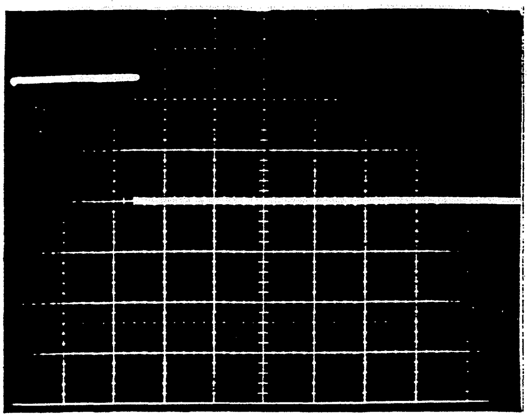
10-5. Servo Waveform

① BT08, Pin ⑦



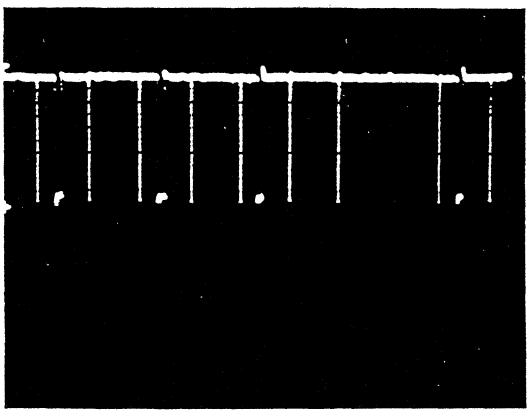
V: 2V/div.
H: 5ms/div.

④ BT08, Pin ⑧



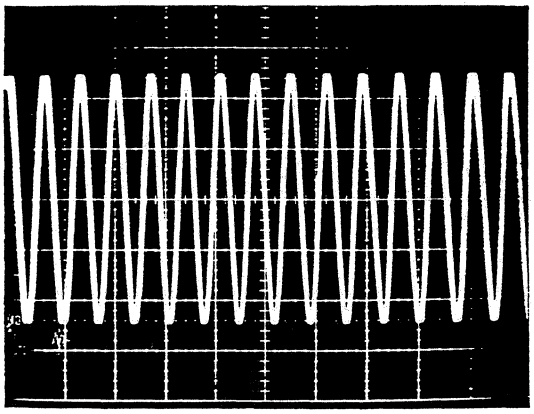
V: 2V/div.
H: 1ms/div.

② BT02, Pin ③



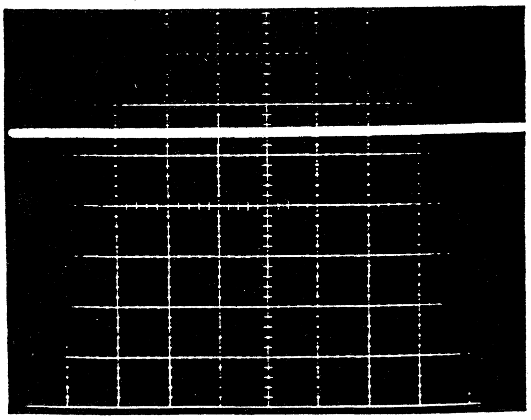
V: 2V/div.
H: 5ms/div.

⑤ BT07, Pin ④



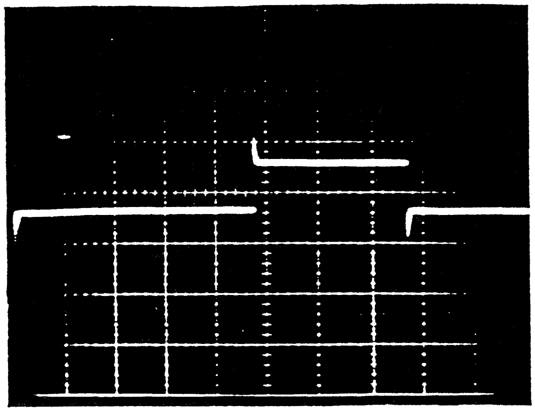
V: 10V/div.
H: 20μs/div.

③ BT02, Pin ①



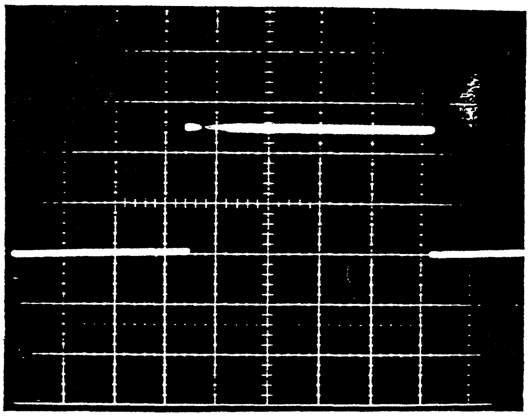
V: 0.5V/div.
H: 0.1ms/div.

⑥ BT04, Pin ⑤



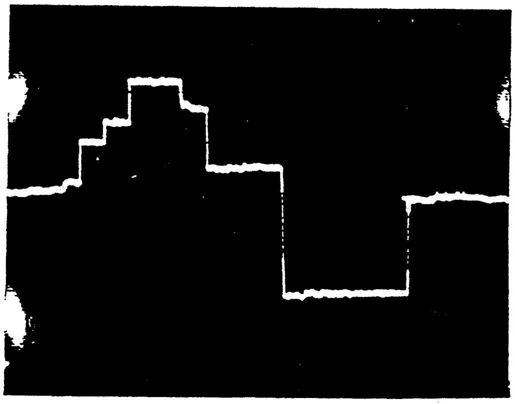
V: 2V/div.
H: 5ms/div.

⑦ BT08, Pin ⑩



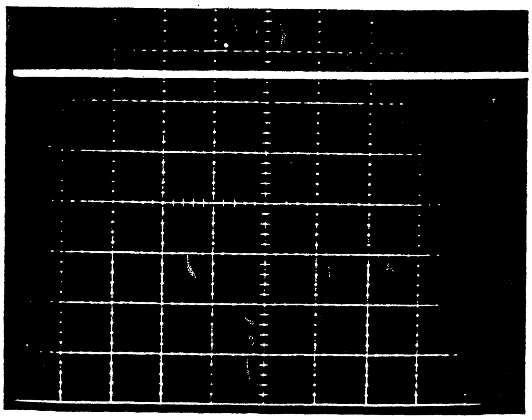
V: 2V/div.
H: 5ms/div.

⑩ BT02, Pin ①



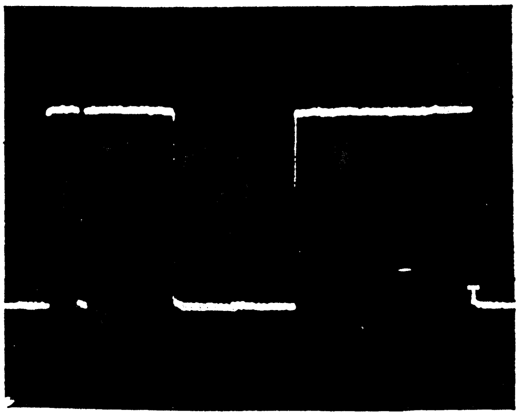
V: 0.2V/div.
H: 10ms/div.

⑧ BT06, Pin ⑧



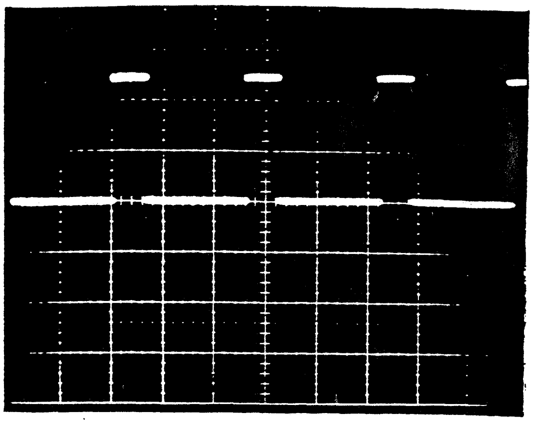
V: 1V/div.
H: 2μs/div.

⑪ BT06, Pin ⑧



V: 0.5V/div.
H: 10ms/div.

⑨ IT01, Pin ㉗



V: 2V/div.
H: 1ms/div.

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SECTION 4
PARTS LIST

SAFETY PRECAUTION

The parts identified by ⚠ mark are critical for safety. Replace only with part number specified. The mounting position of replacement is to be identical with originals. The substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.

NOTICE

The part number must be used when ordering parts in order to assist in processing, be sure to include the model number and description.
Parts marked # are of chip type and mounted on original PC boards.
However, when they are placed for servicing works, use discrete parts listed on the parts list.
This parts list is based on the model V-312T. For other models, diffeerent parts only are listed on the difference list.

ABBREVIATIONS

1. **Integrated circuit (IC)**
2. **Capacitor (Cap)**

- **Unit**

		Ex.
F	farad	
MF	microfarad ($\mu F = 10^{-6} F$)	10MF = 10μF
PF	picofarad ($pF = 10^{-6}\mu F = 10^{-12} F$)	10PF = 10pF

- **Capacitance tolerance (for nominal capacitance higher than 10pF)**

Symbol	**B**	**C**	**D**	**F**	**G**	**J**	**K**	**M**	**N**
Tolerance %	±0.1	±0.25	±0.5	±1	±2	±5	±10	±20	±30

Symbol	**P**	**Q**	**T**	**U**	**V**	**W**	**X**	**Y**	**Z**
Tolerance %	+100 0	+30 −10	+50 −10	+75 −10	+20 −10	+100 −10	+40 −20	+150 −10	+80 −20

Ex. 10MF J = 10μF ±5%

- **Capacitance tolerance (for nominal capacitance lower than 10pF)**

Symbol	**B**	**C**	**D**	**F**	**G**
Tolerance pF	±0.1	±0.25	±0.5	±1	±2

Ex. 10PF G = 10pF ± 2pF

3. **Resistor (Res)**

- **Unit**

		Ex.	
No Mark	Ω	10	10Ω
K	kΩ	10K	10kΩ
M	MΩ	10M	10MΩ
W	Watt	1W	1 Watt

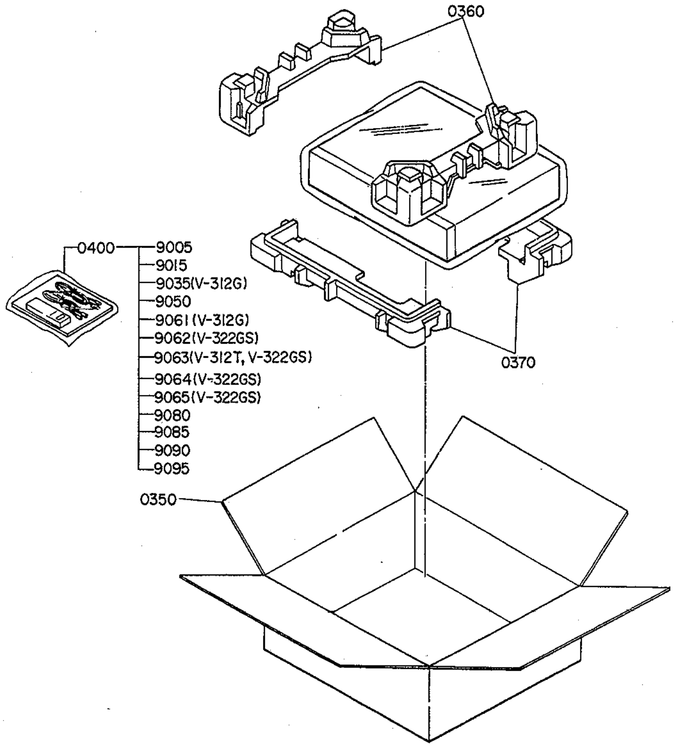
- **Resistance tolerance**

Symbol	**B**	**C**	**D**	**F**	**G**	**J**	**K**	**M**
Tolerance %	±0.1	±0.25	±0.5	±1	±2	±5	±10	±20

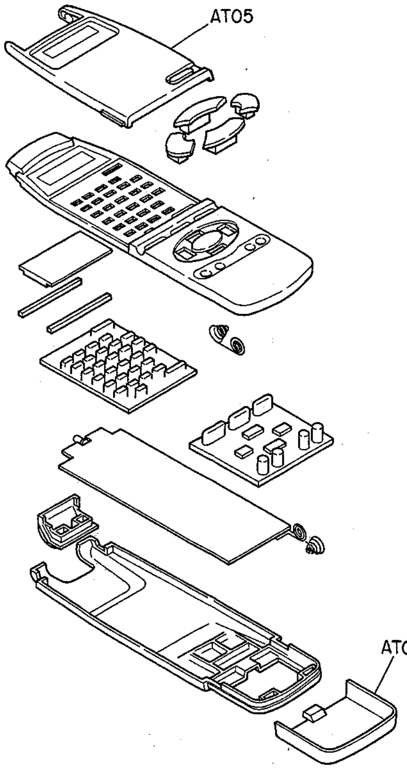
Ex. 470 J = 470Ω ± 5%

1. EXPLODED VIEWS

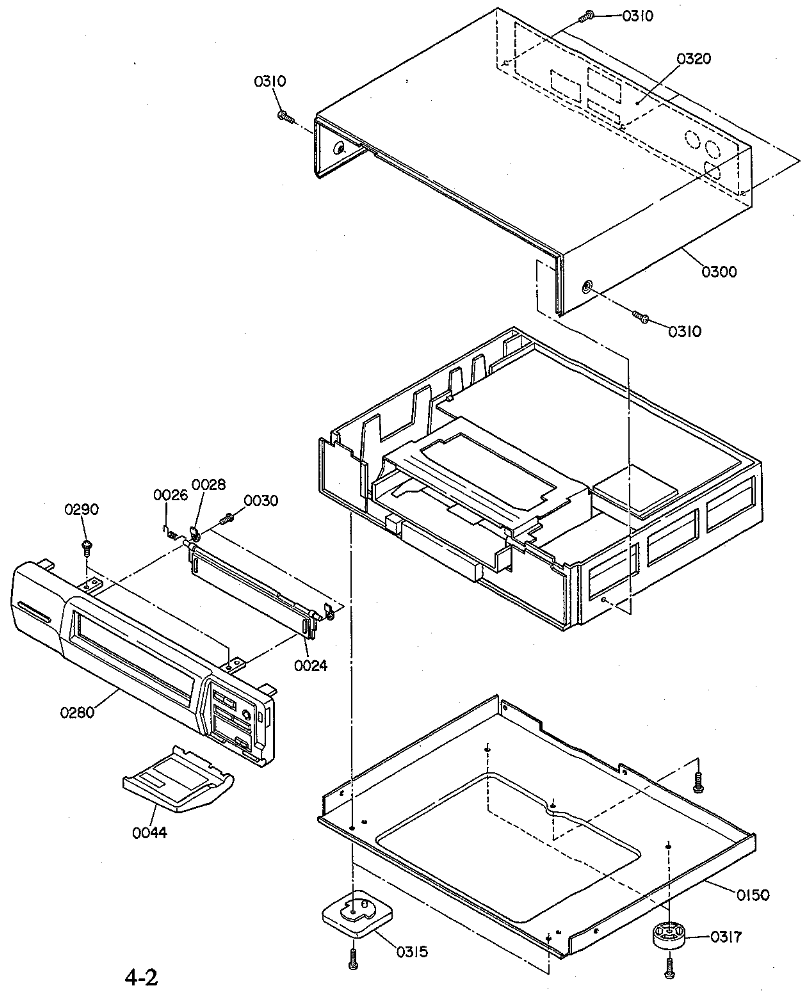
(1) Packing Assembly


0360
0400
9005
9015
9035(V-312G)
9050
9061 (V-312G)
9062(V-322GS)
9063(V-312T, V-322GS)
9064(V-322GS)
9065(V-322GS)
9080
9085
9090
9095
0370
0350

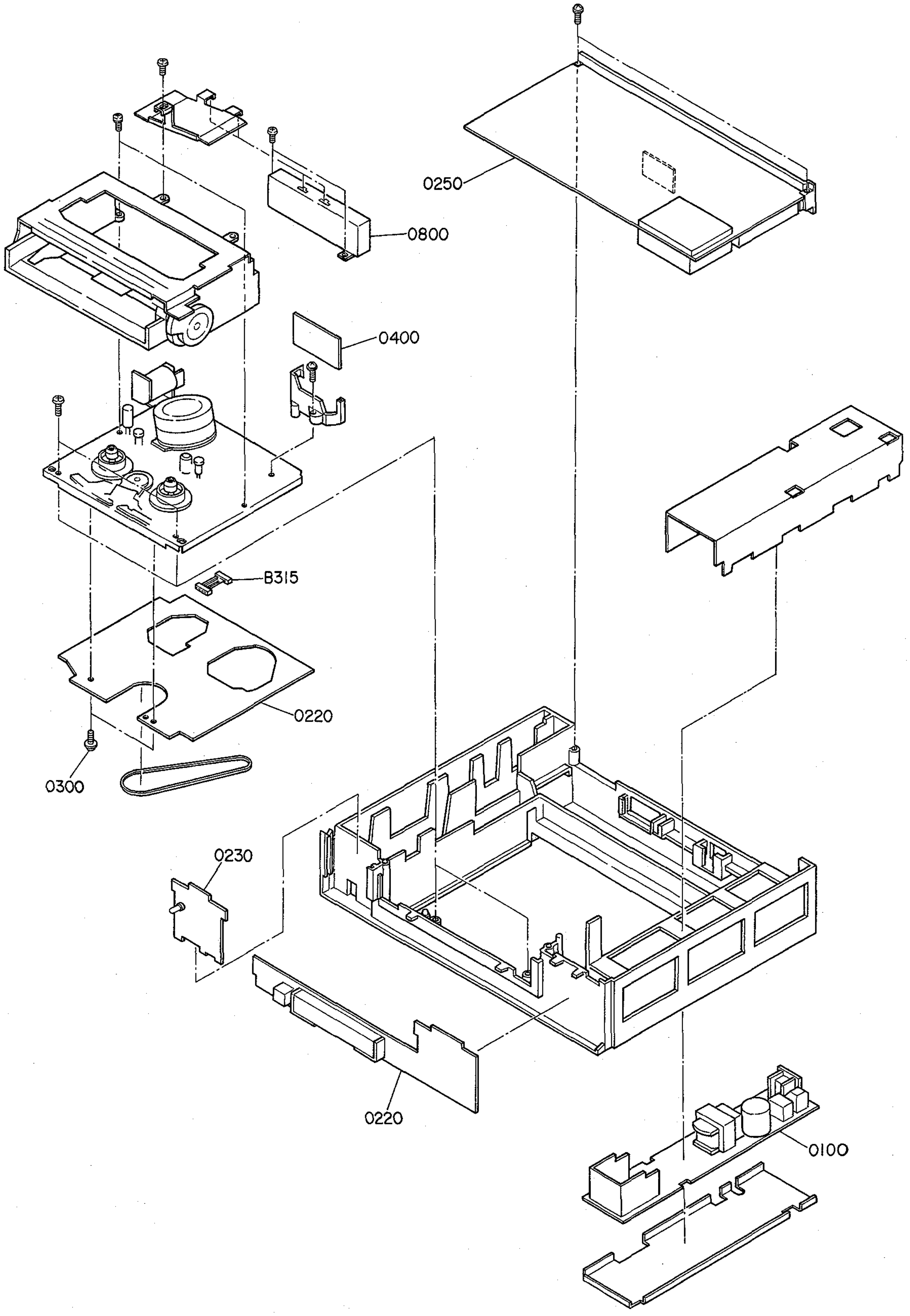
(2) Remote Control Unit



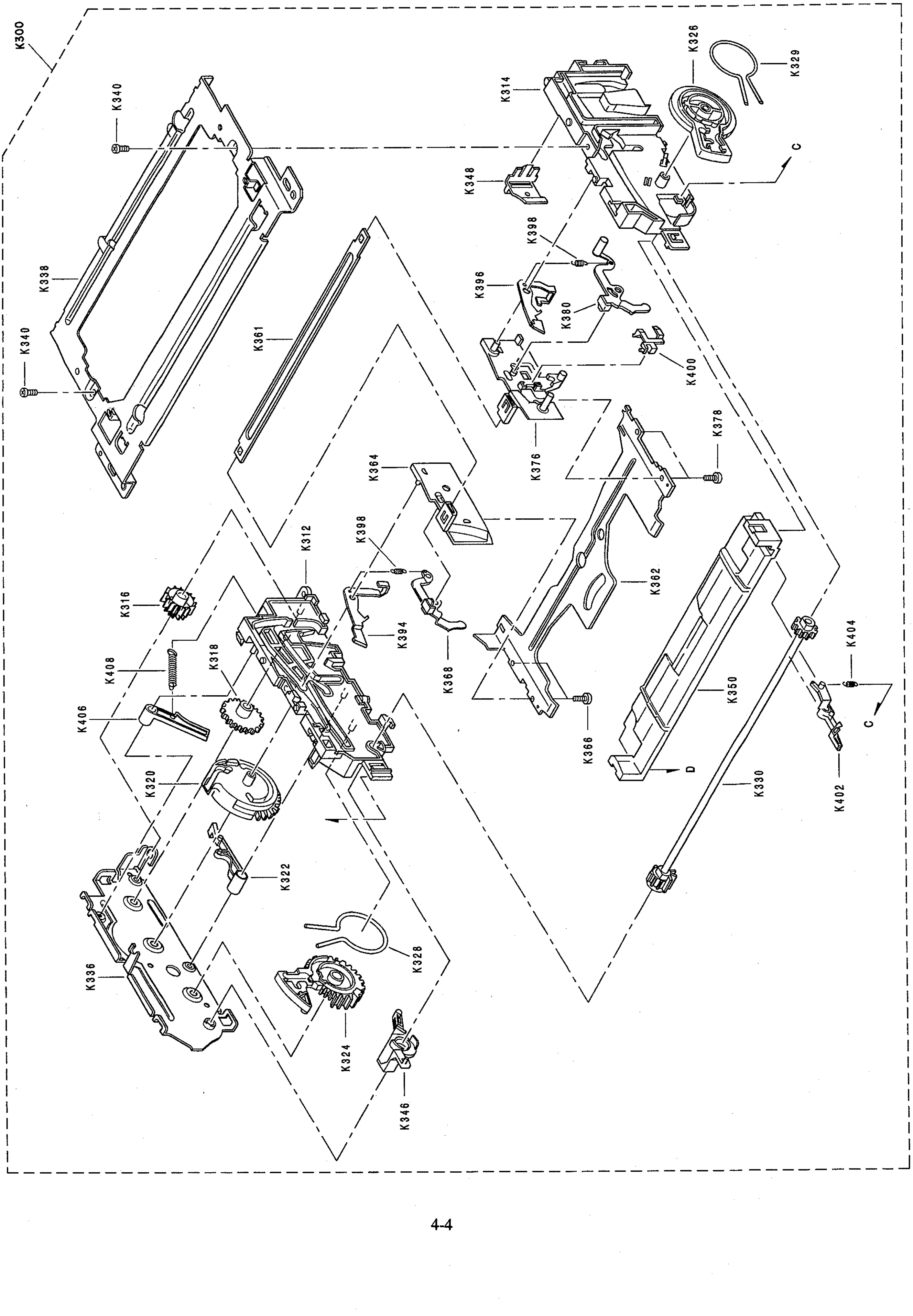
(3) Cabinet Assembly


0310
0320
0310
0300
0310
0290
0026
0028
0030
0024
0280
0044
0150
0317
0315

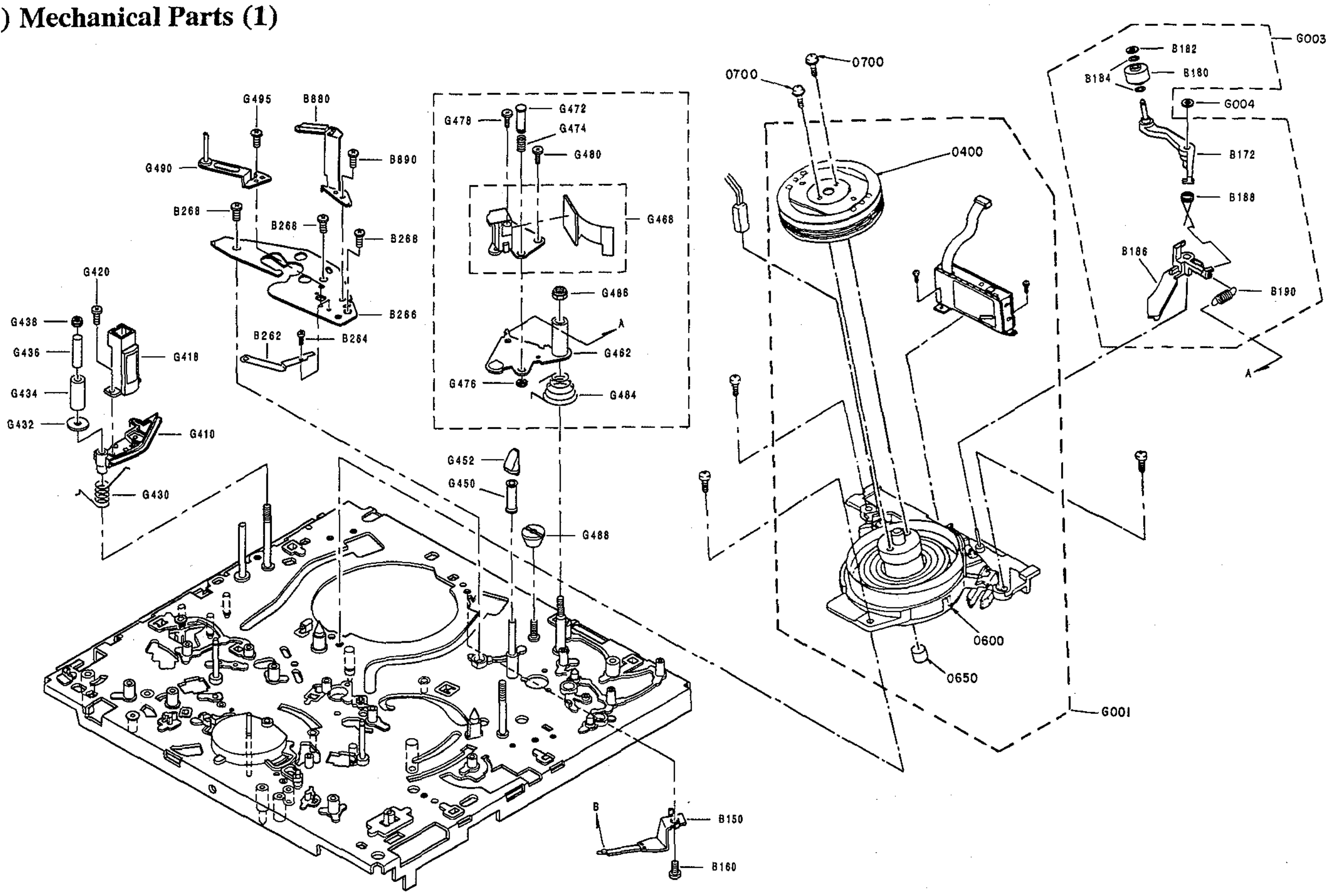
(4) Chassis Assembly


0250
0800
0400
B315
0220
0300
0230
0220
0100

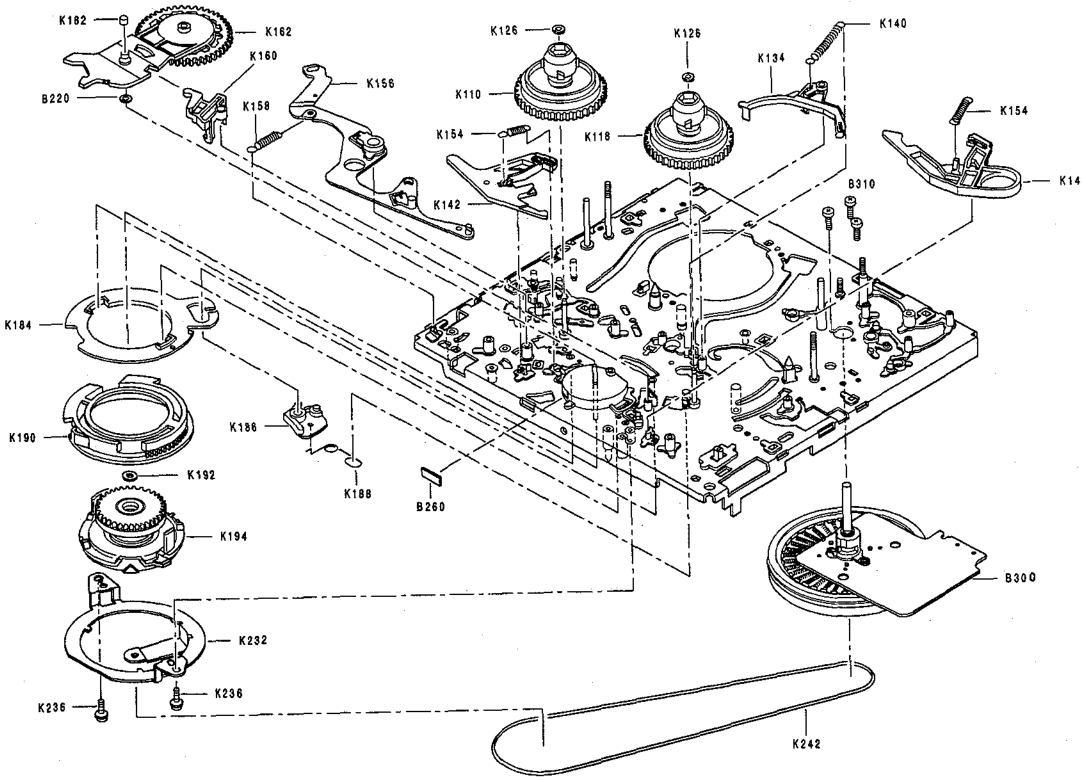
(5) Cassette Holder Assembly


K300
K340
K338
K340
K361
K314
K326
K329
K348
C
K398
K396
K380
K400
K376
K378
K364
K312
K398
K316
K408
K318
K394
K368
K362
K366
K350
D
K404
C
K402
K330
K406
K320
K322
K328
K336
K324
K346

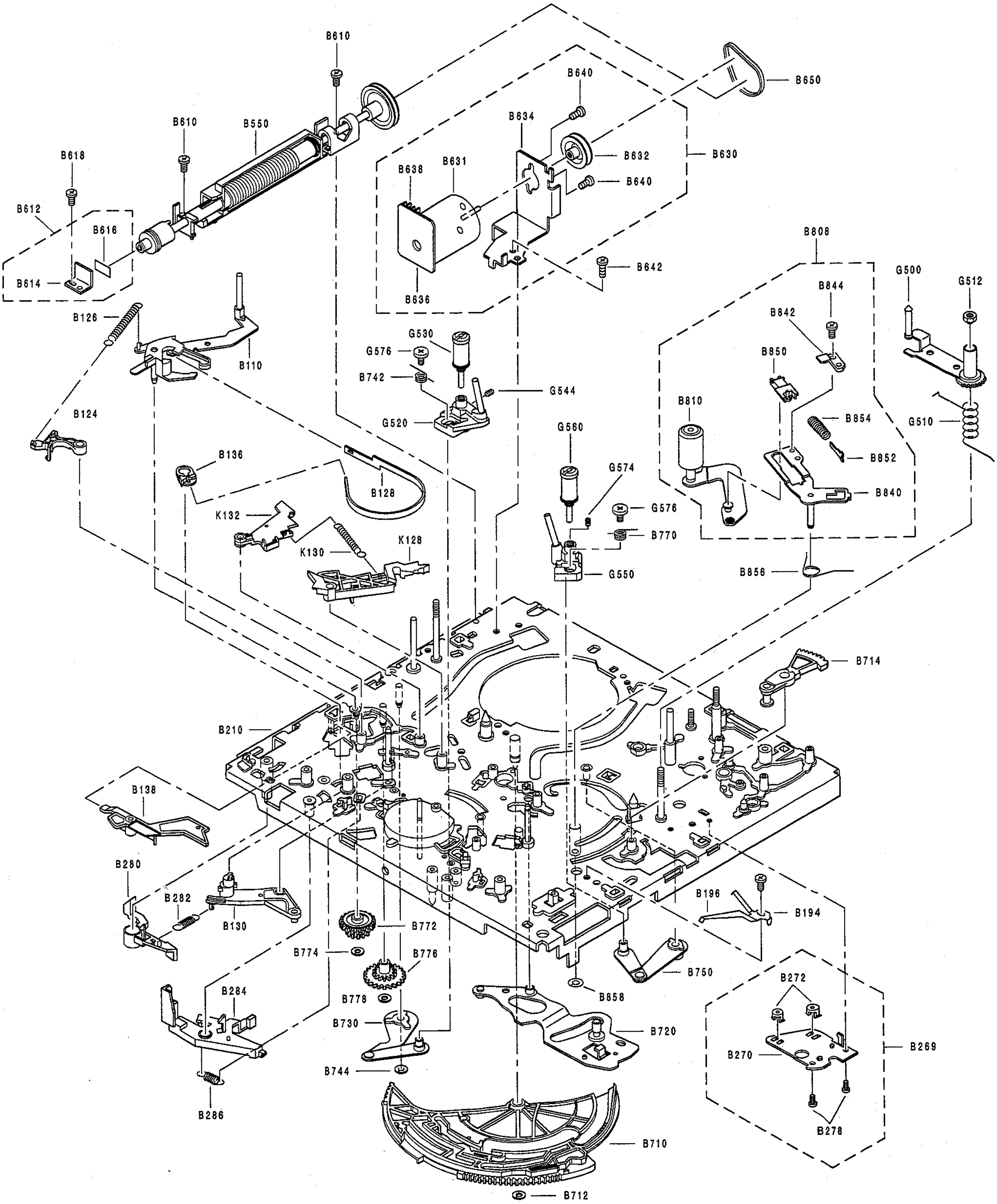
(6) Mechanical Parts (1)


G495
B880
G478
G472
G474
G480
0700
0700
G003
B182
B184
B180
G004
G490
B890
B268
B268
B268
G468
0400
B172
B188
B186
B190
G420
B266
G486
A
G438
B262
B264
G436
G418
G462
G434
G476
G484
A
G432
G410
G430
G452
G450
G488
0600
0650
G001
B
B150
B160

(7) Mechanical Parts (2)


K182
K162
K126
K126
K140
K160
K134
K156
B220
K110
K154
K158
K154
K118
K148
K142
B310
K184
K186
K190
K192
K188
B260
K194
B300
K232
K236
K236
K242

(8) Mechanical Parts (3)


B610
B650
B640
B610
B550
B634
B630
B632
B618
B638
B631
B640
B612
B616
B614
B642
B636
B808
G500
G512
B844
B126
B842
B110
G530
G576
B850
B742
G544
B810
B854
G510
B124
G520
G560
B852
B136
G574
B128
G576
B840
K132
B770
K128
K130
G550
B856
B714
B210
B138
B280
B196
B282
B194
B130
B772
B774
B776
B750
B858
B272
B284
B778
B730
B720
B269
B270
B744
B286
B278
B710
B712

2. PARTS LIST

- MECHANICAL PARTS -

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
0024	70050568	Flap Assy		
0026	70356258	Spring		
0030	70050139	Screw	2.0x6.0mm	
0044	70050446	Door Assy		
0150	70050711	Bottom Cover		
0280	70050445	Front Panel		
0290	70391440	Screw	3x10mm	
0300	70050597	Top Cover		
0310	70030452	Washer		
0315	70050487	Insulator Assy(Front)		
0317	70050490	Insulator Assy(Rear)		
0320	70974708	Label		
0350	70060515	Case		
0360	70060441	Packing Top		
0370	70060442	Packing Bottom		
0400	70031040	Upper Cylinder Assy		
0600	70031066	Lower Cylinder Base Assy		
0650	70050599	Earth Cap Assy		
0700	70030438	Screw	3x10mm	
9005	70060522	Owners Manual(Itarian)		
9005	70060513	Owners Manual(Itarian/Spanish/English)		
9050	70060070	Caution Sheet		
9063	70060552	Quick Reference(Itarian)		
9063	70060554	Quick Reference(English)		
9063	70060555	Quick Reference(Spanish)		
9085	70010883	Remote Control Unit		
9090	70010198	ANT Cable,PAL		
⚠9095	70010354	Mains Cord		
AT03	70108728	Cover,Battery		
AT05	70108740	Cover		
B110	70011000	Tension Arm Assy		
B124	70030975	Tension Lever		
B126	70050643	Spring		
B128	70011075	Band Brake Assy		
B130	70030976	Band Brake Lever Assy		
B136	70011143	Band Holder		
B138	70011050	Drive Mode Slider		
B150	70011117	Ground Brush Assy		
B160	70031067	Screw	3x3mm	
B172	70030991	Lever Assy		
B174	70030999	Lever		
B182	70070050	Washer	4.0x1.6x0.35	
B184	70070065	Washer	3.9x2.1x0.25	
B196	70031067	Screw	3x3mm	
B264	70070059	Screw	2x3mm	
B268	70070060	Screw	2.6x6mm	
B278	70070049	Screw	2.6x4mm	
B280	70030969	F/L Lever		
B282	70050630	Spring		
B284	70030981	REC Inhibit Lever		
B286	70050633	Spring		
B300	70011046	Capstan Motor Assy		
B310	70070001	Screw	2.6x6mm	
B550	70011060	Drive Shaft Assy		
B584	70070026	Washer	5.4x3.1x0.5mm	
B610	70070060	Screw	2.6x6mm	
B612	70011026	Plate Stopper Assy		
B618	70070064	Screw	2.6x3mm	
B630	70011062	Drive Motor Assy		
B642	70050708	Screw	3x4mm	
B650	70011007	Drive Belt		
B710	70011070	Cam Gear		
B712	70070063	Washer	6.0x3.1x0.5mm	
B714	70011088	OSC Drive Assy		
B719	70070015	E Ring		
B720	70011137	P OSC Drive Assy		
B730	70011076	S Load Link Assy		
B733	70041079	Res,Metal	1.2M	F
B742	70050622	Spring		
B744	70050709	Washer	6.0x2.6	
B750	70011127	T Load Link Assy		
B770	70050647	Spring		
B772	70050680	A Mode Drive Gear		
B774	70070058	Washer	4.0x2.1x0.35	
B776	70050674	B Mode Drive Gear		
B778	70070058	Washer	4.0x2.1x0.35	
B808	70011252	Pinch Lever Assy		
B856	70050652	Spring		
B858	70070022	Washer	2.6x5x0.5mm	
B880	70011082	Cap		
B890	70070052	Screw	2x4mm	
G001	70031030	Cylinder Assy		
G003	70011036	Head Cleaner Assy		
G004	70070050	Washer	4.0x1.6x0.35	
G410	70030970	Inlet Lever		
G418	70030633	FE Head		
G420	70070028	Screw	2.6x6mm	
G430	70050649	Spring		
G432	70011130	Flange		
G434	70011131	Guide Roller		
G436	70011101	Guide Sleeve		
G438	70011160	Nut	M2.6x3	
G450	70030388	Guide Sleeve		
G462	70011165	ACE Main Base Sub Assy		
G468	70011166	ACE Sub Base Assy		
G472	70030178	Shaft		
G474	70030250	Spring		
G476	70070015	E Ring		
G478	70070011	Screw	3x0.5x8mm	
G480	70030251	Adjust Screw		
G484	70050640	Spring		
G486	70011160	Nut	M2.6x3	
G490	70011248	NO.10 Guide Assy		
G500	70011056	OSC Guide		
G510	70050635	Spring		
G512	70011023	Nut		
G520	70011154	Slider Assy		
G530	70011155	S Roller Assy		
G544	70070039	Screw	2x3mm	
G550	70011089	T Slider Assy		
G560	70011139	T Roller Assy		
G574	70070039	Screw	2x3mm	
G576	70011068	Stopper		
K110	70011021	S Reel Disk Assy		
K118	70011149	T Reel Disk Assy		
K126	70070008	Washer	1.6x0.35mm	
K128	70030989	S Soft Brake Lever		
K130	70050632	Spring		
K132	70031000	S Slide Lock Lever		
K134	70031001	T Soft Lever Assy		
K136	70030983	T Soft Brake Lever		
K140	70050623	Spring		
K142	70031003	S Brake Lever Assy		
K148	70031004	T Brake Lever Assy		
K154	70050634	Spring		
K156	70030994	Main Brake Charge Lever		
K158	70050629	Spring		
K160	70030988	Idle Arm Lever		
K162	70011106	Idle Arm Assy		
K182	70011121	Idle Arm Cap		
K190	70011120	Clutch Cam		
K192	70011054	Washer		
K194	70011104	Clutch Assy		
K236	70070061	Screw	2.6x10mm	
K242	70011111	Reel Belt		
K300	70011126	Front Loading Assy		
K316	70050675	Worm Wheel T Gear		
K318	70050668	Relay Gear		
K320	70050673	F/L Cam Gear		
K324	70050676	Arm Gear L		
K326	70050681	Arm Gear R		
K330	70050603	Drive Shaft Assy		
K340	70070062	Screw	3x6mm	
K346	70030990	Door Lever		
K402	70030998	Door Lock Lever		
K404	70050641	Spring		

LOCATION NUMBER	PART NUMBER	DESCRIPTION
		DIFFERENCE LIST
V312G		
0024	70050569	Cassette Door
0044	70050511	Door
0280	70050503	Front Panel
0320	70974710	Label
0350	70060518	Case
9005	70060482	Instruction Book
9061	70060550	Quick Reference(German)
9063	--------	Not Used
9085	70010884	Remote Control Unit
AT05	70108760	Cover
V322GS		
0280	70050504	Front Panel
0320	70050485	Label
0350	70060454	Case
9005	70060483	Instruction Book
9062	70060551	Quick Reference(German)
9064	70060553	Quick Reference(French)
9065	70060554	Quick Reference(English)
9085	70010885	Remote Control Unit
AT05	70108746	Cover

LOCATION NUMBER	PART NUMBER	DESCRIPTION

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
		- ELECTRICAL PARTS -		
■0220	70090180	P C Board Assy	Logic/Servo	
		- INTEGRATED CIRCUITS -		
IT01	70010985	IC	ST90T3	
IT25	70010977	IC	U2559B	
IT40	70010979	IC	U2565B	
IT50	70010984	IC	74HC14	
IT60	70010975	IC	L2726	
		- TRANSISTORS -		
TL01	70010131	Transistor	BC337-40	
TT101	70010331	Transistor	BC847B	
TT12	70010331	Transistor	BC847B	
TT14	70010181	Transistor	PT493F	
TT15	70010181	Transistor	PT493F	
TT25	70010331	Transistor	BC847B	
TT26	70010950	Transistor	PZT222	
TT30	70010331	Transistor	BC847B	
TT40	70010332	Transistor	BC857B	
TT41	70010945	Transistor	BCX19	
TT79	70010331	Transistor	BC847B	
TT80	70010331	Transistor	BC847B	
TT81	70010332	Transistor	BC857B	
TT82	70010332	Transistor	BC857B	
TT95	70010948	Transistor	BC857	
		- DIODES -		
DT30	70010342	Diode, Chip	LL4148	
DT31	70010342	Diode, Chip	LL4148	
DT32	70010342	Diode, Chip	LL4148	
DT51	70010342	Diode, Chip	LL4148	
DT52	70010342	Diode, Chip	LL4148	
DT54	70010342	Diode, Chip	LL4148	
DT56	70010342	Diode, Chip	LL4148	
DT58	70010342	Diode, Chip	LL4148	
		- COILS -		
LL01	70010913	Transformer		
LT01	70010927	Coil, Peaking		
		- CAPACITORS -		
CL03	24630850	Cap, Electrolytic	47MF	M 16V
CL04	70041105	Cap, Chip	2. 2NF	M 25V
CL05	70040997	Cap, Chip	10NF	M 25V
CL06	70041054	Cap, Electrolytic	1MF	M 50V
CL07	70041028	Cap, Plastic	47NF	J 250V
CT01	70040730	Cap, Chip	100NF	M 25V
CT02	70040730	Cap, Chip	100NF	M 25V
CT03	70041026	Cap, Chip	1NF	M 50V
CT04	70040730	Cap, Chip	100NF	M 25V
CT05	24815471	Cap, Chip	470PF	K 50V
CT06	24815471	Cap, Chip	470PF	K 50V
CT07	70040984	Cap, Chip	10NF	K 25V
CT08	70041026	Cap, Chip	1NF	M 50V
CT100	70041026	Cap, Chip	1NF	M 50V
CT16	70041026	Cap, Chip	1NF	M 50V
CT17	70041026	Cap, Chip	1NF	M 50V
CT24	70041026	Cap, Chip	1NF	M 50V
CT26	70041113	Cap, Electrolytic	47MF	M 16V
CT27	70040730	Cap, Chip	100NF	M 25V
CT28	70041038	Cap, Electrolytic	10MF	M 16V
CT29	70040628	Cap, Plastic	150NF	J 63V
CT30	70041038	Cap, Electrolytic	10MF	M 16V
CT31	70041029	Cap, Plastic	33NF	J 63V
CT34	70041037	Cap, Electrolytic	47MF	M 16V
CT35	70041014	Cap, Chip	2. 2NF	K 50V
CT36	70041039	Cap, Electrolytic	22MF	M 16V
CT37	70041037	Cap, Electrolytic	47MF	M 16V
CT38	24815471	Cap, Chip	470PF	K 50V
CT39	70041026	Cap, Chip	1NF	M 50V
CT41	70041054	Cap, Electrolytic	1MF	M 50V
CT42	70041113	Cap, Electrolytic	47MF	M 16V
CT43	70040730	Cap, Chip	100NF	M 25V
CT50	70040730	Cap, Chip	100NF	M 25V
CT51	70041021	Cap, Chip	22PF	J 50V
CT53	70041037	Cap, Electrolytic	47MF	M 16V
CT54	70041021	Cap, Chip	22PF	J 50V
CT57	70041037	Cap, Electrolytic	47MF	M 16V
CT61	70040730	Cap, Chip	100NF	M 25V
CT63	70040988	Cap, Chip	1NF	M 25V
CT64	70040730	Cap, Chip	100NF	M 25V
CT66	70041021	Cap, Chip	22PF	J 50V
CT67	70041021	Cap, Chip	22PF	J 50V
CT94	70040730	Cap, Chip	100NF	M 25V
		- RESISTORS -		
RL01	24871479	Res, Chip	4. 7	J 1/8W
⚠RL02	70041075	Res, Fusible	18	J
RL03	24872333	Res, Chip	33K	J 1/16W
RL04	24872183	Res, Chip	18K	J 1/16W
RT01	24871102	Res, Chip	1K	J 1/8W
RT02	24871102	Res, Chip	1K	J 1/8W
RT03	24871102	Res, Chip	1K	J 1/8W
RT04	24871103	Res, Chip	10K	J 1/8W
RT05	24871100	Res, Chip	10	J 1/8W
RT06	24871103	Res, Chip	10K	J 1/8W
RT08	24872103	Res, Chip	10K	J 1/16W
RT09	24872103	Res, Chip	10K	J 1/16W
RT10	24871472	Res, Chip	4. 7K	J 1/8W
RT100	24872682	Res, Chip	6. 8K	J 1/16W
RT101	24872103	Res, Chip	10K	J 1/16W
RT102	24872563	Res, Chip	56K	J 1/16W
RT103	24871153	Res, Chip	15K	J 1/8W
RT104	24872103	Res, Chip	10K	J 1/16W
RT13	24872103	Res, Chip	10K	J 1/16W
RT14	24871273	Res, Chip	27K	J 1/8W
RT15	24872223	Res, Chip	22K	J 1/16W
RT16	24871562	Res, Chip	5. 6K	J 1/8W
RT17	24871562	Res, Chip	5. 6K	J 1/8W
RT18	24872103	Res, Chip	10K	J 1/16W
RT19	24872221	Res, Chip	220	J 1/16W
RT20	24871472	Res, Chip	4. 7K	J 1/8W
RT21	24872562	Res, Chip	5. 6K	J 1/16W
RT22	24871681	Res, Chip	680	J 1/8W
RT23	24871562	Res, Chip	5. 6K	J 1/8W
RT24	24871822	Res, Chip	8. 2K	J 1/8W
RT25	24872392	Res, Chip	3. 9K	J 1/16W
RT26	24872681	Res, Chip	680	J 1/16W
RT27	24872223	Res, Chip	22K	J 1/16W
RT28	24871223	Res, Chip	22K	J 1/8W
RT29	24871222	Res, Chip	2. 2K	J 1/8W
RT30	24872101	Res, Chip	100	J 1/16W
RT31	24872273	Res, Chip	27K	J 1/16W
RT32	24872153	Res, Chip	15K	J 1/16W
RT33	24872273	Res, Chip	27K	J 1/16W
RT34	24872682	Res, Chip	6. 8K	J 1/16W
RT35	24872472	Res, Chip	4. 7K	J 1/16W
RT36	24872222	Res, Chip	2. 2K	J 1/16W
RT37	24872683	Res, Chip	68K	J 1/16W
RT38	24872472	Res, Chip	4. 7K	J 1/16W
RT39	24872391	Res, Chip	390	J 1/16W
RT40	24872101	Res, Chip	100	J 1/16W
RT41	24871474	Res, Chip	470K	J 1/8W
RT42	24871103	Res, Chip	10K	J 1/8W
RT43	24872123	Res, Chip	12K	J 1/16W
RT44	24872103	Res, Chip	10K	J 1/16W
RT45	24871153	Res, Chip	15K	J 1/8W
RT46	24871103	Res, Chip	10K	J 1/8W
RT47	24872472	Res, Chip	4. 7K	J 1/16W
RT48	24871561	Res, Chip	560	J 1/8W
RT49	70041086	Res, Chip	6. 2K	J
RT50	24872103	Res, Chip	10K	J 1/16W
RT51	24872474	Res, Chip	470K	J 1/16W
RT52	24872101	Res, Chip	100	J 1/16W
RT53	24872223	Res, Chip	22K	J 1/16W
RT54	24872474	Res, Chip	470K	J 1/16W
RT55	24871472	Res, Chip	4. 7K	J 1/8W
RT56	24872101	Res, Chip	100	J 1/16W
RT57	24872223	Res, Chip	22K	J 1/16W
RT58	24872103	Res, Chip	10K	J 1/16W
RT59	24872123	Res, Chip	12K	J 1/16W
RT63	24871103	Res, Chip	10K	J 1/8W
RT65	24872103	Res, Chip	10K	J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RT66	24872103	Res, Chip	10K	J 1/16W
RT68	24872221	Res, Chip	220	J 1/16W
RT69	24871103	Res, Chip	10K	J 1/8W
RT72	24871103	Res, Chip	10K	J 1/8W
RT75	24872103	Res, Chip	10K	J 1/16W
RT78	24872682	Res, Chip	6.8K	J 1/16W
RT79	24872103	Res, Chip	10K	J 1/16W
RT80	24871103	Res, Chip	10K	J 1/8W
RT81	24871103	Res, Chip	10K	J 1/8W
RT82	24872103	Res, Chip	10K	J 1/16W
RT83	24871102	Res, Chip	1K	J 1/8W
RT84	24872102	Res, Chip	1K	J 1/16W
RT85	24872562	Res, Chip	5.6K	J 1/16W
RT87	24872102	Res, Chip	1K	J 1/16W
RT88	24872102	Res, Chip	1K	J 1/16W
RT90	24872121	Res, Chip	120	J 1/16W
RT91	24872471	Res, Chip	470	J 1/16W
RT92	24872104	Res, Chip	100K	J 1/16W
RT93	24872104	Res, Chip	100K	J 1/16W
RT95	24872105	Res, Chip	1M	J 1/16W
RT96	24871474	Res, Chip	470K	J 1/8W
RT97	24872103	Res, Chip	10K	J 1/16W
RT98	24872103	Res, Chip	10K	J 1/16W
RT99	24871103	Res, Chip	10K	J 1/8W
J101	70041093	Chip Jumper		
J105	70041093	Chip Jumper		
J106	70041093	Chip Jumper		
J107	70041093	Chip Jumper		
J108	70041096	Chip Jumper		
J109	70041096	Chip Jumper		
J110	70041093	Chip Jumper		
J111	70041093	Chip Jumper		
J112	70041093	Chip Jumper		
J113	70041096	Chip Jumper		
J115	70041093	Chip Jumper		
J116	70041093	Chip Jumper		
J117	70041093	Chip Jumper		
J119	70041096	Chip Jumper		
J120	70041096	Chip Jumper		
J121	70041093	Chip Jumper		
J122	70041093	Chip Jumper		
J123	70041093	Chip Jumper		
J125	70041096	Chip Jumper		
J126	70041096	Chip Jumper		
J127	70041096	Chip Jumper		
J128	70041096	Chip Jumper		
J129	70041096	Chip Jumper		
J131	70041096	Chip Jumper		
J132	70041096	Chip Jumper		
J137	70041093	Chip Jumper		
		- MISCELLANEOUS -		
GT18	70010180	Diode		
GT19	70010961	Photo Interrupter	TCST5123	
GT22	70010960	Photo Interrupter	TCST5133	
GT23	70010961	Photo Interrupter	TCST5123	
GT26	70010960	Photo Interrupter	TCST5133	
QT66	70010934	Crystal	24MHz	
ST04	70070029	Push Switch		
ST71	70070029	Push Switch		
■0800	70090185	P C Board Assy	Pre Amp	
		- INTEGRATED CIRCUITS -		
IQ01	70010978	IC	TEA5706	
		- TRANSISTORS -		
TQ37	70010947	Transistor	BC858	
TQ41	70010150	Transistor	BC848B	
TQ46	70010947	Transistor	BC858	
		- DIODES -		
DQ01	70010340	Diode	1SS181	
DQ02	70010340	Diode	1SS181	
		- COILS -		
LQ02	70010490	Coil, Peaking		
LQ35	70011202	Coil, Peaking		
		- CAPACITORS -		
CQ01	70041023	Cap, Chip	22NF	M 50V
CQ02	70040721	Cap, Electrolytic	22MF	M 16V
CQ03	70040989	Cap, Chip	10NF	K 50V
CQ04	70040978	Cap, Chip	18PF	J 50V
CQ05	70040978	Cap, Chip	18PF	J 50V
CQ06	70040991	Cap, Chip	4.7NF	M 50V
CQ07	70040991	Cap, Chip	4.7NF	M 50V
CQ08	70040989	Cap, Chip	10NF	K 50V
CQ09	70040989	Cap, Chip	10NF	K 50V
CQ10	70040989	Cap, Chip	10NF	K 50V
CQ11	70041017	Cap, Chip	470PF	K 50V
CQ12	70041011	Cap, Chip	10PF	J 50V
CQ13	70040978	Cap, Chip	18PF	J 50V
CQ14	70041017	Cap, Chip	470PF	K 50V
CQ15	70040991	Cap, Chip	4.7NF	M 50V
CQ16	70040991	Cap, Chip	4.7NF	M 50V
CQ17	70041007	Cap, Chip	22NF	M 25V
CQ21	70041023	Cap, Chip	22NF	M 50V
CQ26	70041007	Cap, Chip	22NF	M 25V
CQ28	70041023	Cap, Chip	22NF	M 50V
CQ29	24774470	Cap, Chip	47PF	J 50V
CQ30	70041016	Cap, Chip	47PF	J 50V
CQ31	24815102	Cap, Chip	1000PF	K 50V
CQ34	70041108	Cap, Chip	10NF	M 50V
CQ35	70041111	Cap, Electrolytic	470MF	M 10V
CQ36	70041108	Cap, Chip	10NF	M 50V
CQ40	70040524	Cap, Electrolytic	22MF	X 10V
CQ41	70040992	Cap, Chip	470NF	Z 25V
		- RESISTORS -		
RQ11	24871431	Res, Chip	430	J 1/8W
RQ14	70041095	Res, Chip	360	J
RQ21	24872392	Res, Chip	3.9K	J 1/16W
RQ22	24872202	Res, Chip	2K	J 1/16W
RQ23	24872182	Res, Chip	1.8K	J 1/16W
RQ24	24872392	Res, Chip	3.9K	J 1/16W
RQ25	24872150	Res, Chip	15	J 1/16W
RQ29	24872472	Res, Chip	4.7K	J 1/16W
RQ30	24872472	Res, Chip	4.7K	J 1/16W
RQ32	24872820	Res, Chip	82	J 1/16W
RQ33	24871102	Res, Chip	1K	J 1/8W
RQ34	70041096	Chip Jumper		
RQ36	24872102	Res, Chip	1K	J 1/16W
RQ37	24872101	Res, Chip	100	J 1/16W
RQ40	24872472	Res, Chip	4.7K	J 1/16W
RQ41	24872331	Res, Chip	330	J 1/16W
RQ42	24872183	Res, Chip	18K	J 1/16W
RQ43	24872103	Res, Chip	10K	J 1/16W
RQ44	24872472	Res, Chip	4.7K	J 1/16W
RQ45	24872102	Res, Chip	1K	J 1/16W
RQ46	24872183	Res, Chip	18K	J 1/16W
RQ47	24872822	Res, Chip	8.2K	J 1/16W
RQ48	24872470	Res, Chip	47	J 1/16W
JQ01	70041093	Chip Jumper		
JQ03	70041096	Chip Jumper		
JQ04	70041093	Chip Jumper		
JQ06	70041093	Chip Jumper		
JQ08	70041093	Chip Jumper		
JQ09	70041093	Chip Jumper		
JQ10	70041093	Chip Jumper		
JQ12	70041093	Chip Jumper		
JQ13	70041093	Chip Jumper		
JQ14	70041093	Chip Jumper		
JQ15	70041093	Chip Jumper		
JQ16	70041093	Chip Jumper		
■0400	70090179	P C Board Assy	Audio	
		- INTEGRATED CIRCUITS -		
IO10	70010976	IC	LA7282M	
		- TRANSISTORS -		
TO31	70010150	Transistor	BC848B	
		- COILS -		
LO24	70010921	Coil, Peaking		
		- CAPACITORS -		
CO01	70041059	Cap, Ceramic	470PF	M 40V
CO11	70040247	Cap, Ceramic, Chip	1NF	J 50V
CO13	70041036	Cap, Plastic	10NF	G 63V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
C014	70041037	Cap, Electrolytic	47MF	M 16V
C015	70040730	Cap, Chip	100NF	M 25V
C016	24794220	Cap, Electrolytic	22MF	M 16V
C017	70040730	Cap, Chip	100NF	M 25V
C018	70041065	Cap, Chip	100PF	K 50V
C022	70041039	Cap, Electrolytic	22MF	M 16V
C023	70041053	Cap, Electrolytic	4. 7MF	M 35V
C024	70041036	Cap, Plastic	10NF	G 63V
C025	70041024	Cap, Chip	33NF	K 50V
C027	70040607	Cap, Electrolytic	10MF	M 16V
C028	70040268	Cap, Ceramic, Chip	22NF	K 25V
C029	70040493	Cap, Chip	10NF	K 50V
C030	70040493	Cap, Chip	10NF	K 50V
		- RESISTORS -		
R003	24872393	Res, Chip	39K	J 1/16W
R010	24872100	Res, Chip	10	J 1/16W
R011	24872333	Res, Chip	33K	J 1/16W
R012	70041087	Res, Chip	332K	F
R013	70041092	Res, Chip	10K	F
R014	24872470	Res, Chip	47	J 1/16W
R016	24871225	Res, Chip	2200K	J 1/8W
R017	24872683	Res, Chip	68K	J 1/16W
R019	24871103	Res, Chip	10K	J 1/8W
R021	24871103	Res, Chip	10K	J 1/8W
R023	24871223	Res, Chip	22K	J 1/8W
R024	24871471	Res, Chip	470	J 1/8W
R025	24872271	Res, Chip	270	J 1/16W
R026	24872622	Res, Chip	6. 2K	J 1/16W
R027	24872153	Res, Chip	15K	J 1/16W
R031	24872224	Res, Chip	220K	J 1/16W
R032	24871473	Res, Chip	47K	J 1/8W
R033	24871103	Res, Chip	10K	J 1/8W
JY01	70041096	Chip Jumper		
JY02	70041096	Chip Jumper		
JY03	70041096	Chip Jumper		
JY04	70041096	Chip Jumper		
JY05	70041093	Chip Jumper		
JY06	70041096	Chip Jumper		
P001	70041099	Res, Variable	100	N
P013	70041100	Res, Variable	10K	N
		- MISCELLANEOUS -		
0900	70030656	Screw	2. 6x5mm	
■0100	70090181	P C Board Assy	Power	
		- TRANSISTORS -		
TP01	70010949	Transistor	BC858	
TP02	70010946	Transistor	BC848	
TP03	70010949	Transistor	BC858	
TP04	70010949	Transistor	BC858	
TP05	70010946	Transistor	BC848	
TP06	70010942	Transistor	BC848	
TP07	70010951	Transistor	BCP69	
TP08	70010940	Transistor	TE02499F	
TP71	70010149	Transistor	BD435	
TP72	70010942	Transistor	BC848	
TP73	70010942	Transistor	BC848	
TP74	70010942	Transistor	BC848	
TP81	70010939	Transistor	MPS750	
TP82	70010948	Transistor	BC857	
TP83	70010939	Transistor	MPS750	
TP86	70010148	Transistor	BD434	
TP87	70010942	Transistor	BC848	
TP91	70010941	Transistor	BCP53-16	
TP92	70010952	Transistor	BC817-40	
TP93	70010949	Transistor	BC858	
		- DIODES -		
DP01	70010956	Diode	1N4007	
DP02	70010956	Diode	1N4007	
DP03	70010956	Diode	1N4007	
DP04	70010956	Diode	1N4007	
DP06	70010957	Diode, Zener	ZPD10	
DP07	70010342	Diode, Chip	LL4148	
DP08	70010958	Diode, Zener	ZPD6. 2	
DP09	70010342	Diode, Chip	LL4148	
DP11	70010342	Diode, Chip	LL4148	
DP12	70010153	Diode	1N4148	
DP13	70010958	Diode, Zener	ZPD6. 2	
DP16	70010153	Diode	1N4148	
DP31	70010453	Diode	1N4001	
DP32	70010453	Diode	1N4001	
DP41	70010450	Diode	BA157	
DP51	70010817	Diode	1N4148	
DP61	70010953	Diode	BYV28-150	
DP71	70010954	Diode	BA158	
DP74	70010618	Diode, Zener	6V8	
DP81	70010456	Diode	1N5822	
DP82	70010456	Diode	1N5822	
DP86	70010959	Diode, Zener	ZPD10	
DP90	70010450	Diode	BA157	
DP91	70010953	Diode	BYV28-150	
DP92	70010953	Diode	BYV28-150	
DP93	70010153	Diode	1N4148	
DP94	70010959	Diode, Zener	ZPD10	
DP95	70010955	Diode	MUR115	
DP96	70010450	Diode	BA157	
		- COILS -		
⚠LP01	70010916	Filter		
⚠LP02	70010915	Filter		
⚠LP20	70010914	Power Transformer		
LP51	70010922	Coil, Peaking		
LP61	70010925	Coil, Peaking		
LP71	70010922	Coil, Peaking		
LP81	70010925	Coil, Peaking		
LP91	70010925	Coil, Peaking		
		- CAPACITORS -		
⚠CP01	70040056	Cap, Plastic	100NF	M 275V
CP02	70041047	Cap, Electrolytic	47MF	M 385V
CP03	70041033	Cap, Plastic	56NF	M 63V
⚠CP04	70041057	Cap, Ceramic	2. 2NF	M 40V
CP041	70041058	Cap, Ceramic	2. 2NF	M 40V
CP05	24636010	Cap, Electrolytic	1MF	M 50V
CP06	24636010	Cap, Electrolytic	1MF	M 50V
CP07	24636010	Cap, Electrolytic	1MF	M 50V
CP08	70041035	Cap, Plastic	2. 2NF	M 10V
CP09	70040052	Cap, Plastic	100NF	M 63V
CP10	24797100	Cap, Electrolytic	10MF	M 50V
CP11	70041061	Cap, Ceramic	330PF	M 3KV
CP12	70041015	Cap, Chip	10NF	M 50V
CP13	70041034	Cap, Plastic	39NF	J 63V
CP14	70040993	Cap, Chip	330PF	K 50V
CP16	70041110	Cap, Plastic	330NF	J 63V
CP41	24792471	Cap, Electrolytic	470MF	M 6. 3V
CP50	70041062	Cap, Ceramic	180PF	K 40V
CP51	24797100	Cap, Electrolytic	10MF	M 50V
CP52	70040421	Cap, Electrolytic	220MF	M 35V
CP60	70041060	Cap, Ceramic	68PF	J 400V
CP61	70041056	Cap, Electrolytic	820MF	M 25V
CP62	70041046	Cap, Electrolytic	1000MF	X 25V
CP71	70040772	Cap, Electrolytic	47MF	M 50V
CP72	70041112	Cap, Electrolytic	100MF	X 50V
CP73	70041031	Cap, Plastic	10NF	M 10V
CP81	70041049	Cap, Electrolytic	1000MF	M 16V
CP82	70041045	Cap, Electrolytic	1000MF	X
CP83	70040725	Cap, Electrolytic	100	M 25V
CP90	70040408	Cap, Plastic	22NF	K 250V
CP91	70040227	Cap, Ceramic, Chip	1NF	J 50V
CP92	70041048	Cap, Electrolytic	1200MF	M 16V
CP93	70041040	Cap, Electrolytic	1000MF	X 16V
CP94	70040272	Cap, Ceramic, Chip	680PF	J 50V
		- RESISTORS -		
RP04	24871184	Res, Chip	180K	J 1/8W
RP06	24871184	Res, Chip	180K	J 1/8W
RP07	24871184	Res, Chip	180K	J 1/8W
RP09	24871101	Res, Chip	100	J 1/8W
RP10	24871472	Res, Chip	4. 7K	J 1/8W
RP11	24871472	Res, Chip	4. 7K	J 1/8W
RP12	24871103	Res, Chip	10K	J 1/8W
RP13	24871471	Res, Chip	470	J 1/8W
RP14	24871229	Res, Chip	2. 2	J 1/8W
RP15	24871821	Res, Chip	820	J 1/8W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RP16	24871332	Res, Chip	3.3K	J 1/8W
RP17	24871103	Res, Chip	10K	J 1/8W
RP18	24871103	Res, Chip	10K	J 1/8W
RP20	24871100	Res, Chip	10	J 1/8W
RP21	70041072	Res, Carbon	120	J 0.7W
RP23	24871332	Res, Chip	3.3K	J 1/8W
RP24	24871123	Res, Chip	12K	J 1/8W
RP26	24871103	Res, Chip	10K	J 1/8W
RP27	24871473	Res, Chip	47K	J 1/8W
RP28	24871272	Res, Chip	2.7K	J 1/8W
RP29	24871120	Res, Chip	12	J 1/8W
RP30	24871562	Res, Chip	5.6K	J 1/8W
RP31	24871473	Res, Chip	47K	J 1/8W
RP32	24871562	Res, Chip	5.6K	J 1/8W
RP33	70041083	Res, Wire Wound	1.5	J 4W
⚠RP41	70041081	Res, Fusible	0.1	F 0.4W
RP46	24871103	Res, Chip	10K	J 1/8W
RP47	24871103	Res, Chip	10K	J 1/8W
⚠RP51	70041077	Res, Fusible	8.2	J 0.3W
RP61	24871822	Res, Chip	8.2K	J 1/8W
RP62	24871822	Res, Chip	8.2K	J 1/8W
RP63	24871822	Res, Chip	8.2K	J 1/8W
RP64	24871822	Res, Chip	8.2K	J 1/8W
RP65	24871822	Res, Chip	8.2K	J 1/8W
⚠RP66	70041081	Res, Fusible	0.1	F 0.4W
RP70	70040101	Res, Carbon	680	J
⚠RP71	70041073	Res, Fusible	22	J 0.3W
RP75	24871121	Res, Chip	120	J 1/8W
RP76	70041070	Res, Carbon	220	J 1/4W
RP77	24871102	Res, Chip	1K	J 1/8W
RP78	70041082	Res, Oxide Metal	150	J 2W
RP79	24871562	Res, Chip	5.6K	J 1/8W
RP80	24871103	Res, Chip	10K	J 1/8W
RP81	24366101	Res, Carbon	100	J 1/6W
RP82	24871103	Res, Chip	10K	J 1/8W
RP83	24871121	Res, Chip	120	J 1/8W
RP84	24871121	Res, Chip	120	J 1/8W
RP85	24871121	Res, Chip	120	J 1/8W
RP86	70041074	Res, Fusible	27	J 0.3W
RP87	70041090	Res, Chip	4.64K	F
RP88	24871151	Res, Chip	150	J 1/8W
RP89	70041091	Res, Chip	1K	F 0.4W
RP90	70041084	Res, Wire Wound	68	J 5W
⚠RP91	70041078	Res, Fusible	1.5	J 0.3W
⚠RP92	70041076	Res, Fusible	470	J 0.3W
RP93	24871472	Res, Chip	4.7K	J 1/8W
RP94	24871681	Res, Chip	680	J 1/8W
RP95	24871222	Res, Chip	2.2K	J 1/8W
RP96	24871821	Res, Chip	820	J 1/8W
RP97	24871272	Res, Chip	2.7K	J 1/8W
RP98	70041085	Res, Chip	3.32K	F
RP99	70041091	Res, Chip	1K	F 0.4W
JP20	70041093	Chip Jumper		
JP21	70041093	Chip Jumper		
PP91	70041098	Res, Variable	2.2K	M
DP14	70041093	Chip Jumper		
		- MISCELLANEOUS -		
0010	70010457	Diode	MUR115	
⚠FP01	70010445	Fuse, 1A, 250V		
FP011	70010207	Fuse Holder		
⚠FP02	70010515	Fuse	0.63A, 250V	
TP711	70010538	Spring Clip		
TP861	70010538	Spring Clip		
■0220	70090178	P C Board Assy	Key Display	
		- INTEGRATED CIRCUITS -		
IK01	70010974	IC	TC89101P	
IR01	23120371	F.U	IR-9106-K	
		- TRANSISTORS -		
TK01	70010947	Transistor	BC858	
TK02	70010134	Transistor	BC548B	
TK03	70010134	Transistor	BC548B	
TK04	70010134	Transistor	BC548B	
		- DIODES -		
DK02	70010342	Diode, Chip	LL4148	
DK03	70010342	Diode, Chip	LL4148	
DK08	70010342	Diode, Chip	LL4148	
DK09	70010342	Diode, Chip	LL4148	
DK11	70010342	Diode, Chip	LL4148	
DK12	70010342	Diode, Chip	LL4148	
DK13	70010342	Diode, Chip	LL4148	
DK14	70010342	Diode, Chip	LL4148	
DK15	70010342	Diode, Chip	LL4148	
DK17	70010342	Diode, Chip	LL4148	
DK20	70010962	Diode, Zener	ZMM2.7	
		- CAPACITORS -		
CK01	24783101	Cap, Chip	100PF	J 50V
CK02	24783101	Cap, Chip	100PF	J 50V
CK03	24783101	Cap, Chip	100PF	J 50V
CK04	24783101	Cap, Chip	100PF	J 50V
CK05	24783101	Cap, Chip	100PF	J 50V
CK07	70041066	Cap	0.1F	Z
CK08	24815223	Cap, Chip	0.022MF	K 50V
CK09	24203470	Cap, Electrolytic	47MF	M 16V
CK10	24774569	Cap, Chip	5.6PF	
CK11	24774150	Cap, Chip	15PF	J 50V
CK12	70041027	Cap, Variable		100V
CK13	24774330	Cap, Chip	33PF	J 50V
CK14	24774330	Cap, Chip	33PF	J 50V
CK15	70040493	Cap, Chip	10NF	K 50V
CK16	24793101	Cap, Electrolytic	100MF	M 10V
CK17	70040493	Cap, Chip	10NF	K 50V
CK20	24815223	Cap, Chip	0.022MF	K 50V
		- RESISTORS -		
RK01	24872103	Res, Chip	10K	J 1/16W
RK02	24872332	Res, Chip	3.3K	J 1/16W
RK03	24872103	Res, Chip	10K	J 1/16W
RK04	24872332	Res, Chip	3.3K	J 1/16W
RK05	24872103	Res, Chip	10K	J 1/16W
RK06	24872103	Res, Chip	10K	J 1/16W
RK07	24872472	Res, Chip	4.7K	J 1/16W
RK08	24872103	Res, Chip	10K	J 1/16W
RK09	24872103	Res, Chip	10K	J 1/16W
RK10	24872472	Res, Chip	4.7K	J 1/16W
RK11	24872102	Res, Chip	1K	J 1/16W
RK12	24872221	Res, Chip	220	J 1/16W
RK13	24872683	Res, Chip	68K	J 1/16W
RK14	24872683	Res, Chip	68K	J 1/16W
RK15	24872223	Res, Chip	22K	J 1/16W
RK16	24872102	Res, Chip	1K	J 1/16W
RK17	24872222	Res, Chip	2.2K	J 1/16W
RK18	24872223	Res, Chip	22K	J 1/16W
RK19	24872103	Res, Chip	10K	J 1/16W
RK20	24872472	Res, Chip	4.7K	J 1/16W
RK21	24872472	Res, Chip	4.7K	J 1/16W
RK22	24872472	Res, Chip	4.7K	J 1/16W
RK23	24872472	Res, Chip	4.7K	J 1/16W
RK24	24872103	Res, Chip	10K	J 1/16W
RK25	24872103	Res, Chip	10K	J 1/16W
RK26	24872103	Res, Chip	10K	J 1/16W
RK27	24872103	Res, Chip	10K	J 1/16W
RK28	24872223	Res, Chip	22K	J 1/16W
RK29	24872223	Res, Chip	22K	J 1/16W
RK30	24872223	Res, Chip	22K	J 1/16W
RK31	24872223	Res, Chip	22K	J 1/16W
RK32	24872221	Res, Chip	220	J 1/16W
RK33	24872221	Res, Chip	220	J 1/16W
RK34	24872221	Res, Chip	220	J 1/16W
RK35	24872221	Res, Chip	220	J 1/16W
RK36	24872103	Res, Chip	10K	J 1/16W
RK37	24872103	Res, Chip	10K	J 1/16W
RK38	24872103	Res, Chip	10K	J 1/16W
RK44	24872472	Res, Chip	4.7K	J 1/16W
RK45	24872221	Res, Chip	220	J 1/16W
RK46	24872221	Res, Chip	220	J 1/16W
RK47	24872221	Res, Chip	220	J 1/16W
RK48	24872221	Res, Chip	220	J 1/16W
RK49	24872221	Res, Chip	220	J 1/16W
RK50	24872221	Res, Chip	220	J 1/16W
RK51	24872221	Res, Chip	220	J 1/16W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RK52	24872221	Res,Chip	220	J 1/16W
RK53	24872221	Res,Chip	220	J 1/16W
RK54	24872221	Res,Chip	220	J 1/16W
RK55	24872562	Res,Chip	5.6K	J 1/16W
RK56	24872153	Res,Chip	15K	J 1/16W
		- MISCELLANEOUS -		
GK01	70011189	FIP	7-BT-159G	
QK01	70010116	Crystal,32KHz		
QK02	70010937	Resonator	8MHz	
SK03	23145394	Push Switch,1C1P		
SK05	23145394	Push Switch,1C1P		
SK07	23145394	Push Switch,1C1P		
SK08	23145394	Push Switch,1C1P		
SK09	23145394	Push Switch,1C1P		
SK10	23145394	Push Switch,1C1P		
SK13	23145394	Push Switch,1C1P		
■0230	70090182	P C Board Assy	Key Board	
		- MISCELLANEOUS -		
GK02	A8605671	Diode,LED	TLG113A(FA)	
SK14	23145394	Push Switch,1C1P		
SK16	23145394	Push Switch,1C1P		
■0250	70090183	P C Board Assy	Main	
		- INTEGRATED CIRCUITS -		
IA01	70010967	IC	TDA8128	
IA40	70010972	IC	M50558-117S	
IF21	70010172	IC	MSM7401RS	
II40	70010531	IC	TDA5930	
IN01	70010966	IC	AN3248NK	
IN15	70010982	IC	74HC00	
IN16	70010983	IC	74HC74	
IS50	70010968	IC	LA7051	
IV40	70010971	IC	TA8757AN	
IV70	70119858	IC	LA7311	
IW20	70010981	IC	MC14094BD	
IW25	70010981	IC	MC14094BD	
IW28	70010664	IC	HEF4053BT	
IW35	70010970	IC	TBA120T	
IW65	70010980	IC	HEF4052BT	
IW85	70010981	IC	MC14094BD	
IJ01	70010969	IC	BA7046	
		- TRANSISTORS -		
TA46	70010150	Transistor	BC848B	
TC48	70010942	Transistor	BC848	
TF02	70010150	Transistor	BC848B	
TF06	70010150	Transistor	BC848B	
TF09	70010947	Transistor	BC858	
TF16	70010150	Transistor	BC848B	
TF26	70010150	Transistor	BC848B	
TF30	70010150	Transistor	BC848B	
TF33	70010150	Transistor	BC848B	
TF41	70010150	Transistor	BC848B	
TF45	70010942	Transistor	BC848	
TI10	70010521	Transistor	BF799	
TN01	70010947	Transistor	BC858	
TN03	70010150	Transistor	BC848B	
TN28	70010150	Transistor	BC848B	
TV03	70010150	Transistor	BC848B	
TV08	70010150	Transistor	BC848B	
TV14	70010150	Transistor	BC848B	
TV17	70010150	Transistor	BC848B	
TV25	70010150	Transistor	BC848B	
TV26	70010150	Transistor	BC848B	
TV31	70010150	Transistor	BC848B	
TV45	70010947	Transistor	BC858	
TV53	70010150	Transistor	BC848B	
TV60	70010150	Transistor	BC848B	
TV85	70010150	Transistor	BC848B	
TV86	70010150	Transistor	BC848B	
TW03	70010947	Transistor	BC858	
TW07	A6004030	Transistor,Chip	RN1403	
TW11	70010150	Transistor	BC848B	
TW14	70010949	Transistor	BC858	
TW23	A6004030	Transistor,Chip	RN1403	
TW44	70010150	Transistor	BC848B	
TW51	70010942	Transistor	BC848	
TW56	70010944	Transistor	BC847	
TW65	70010150	Transistor	BC848B	
TW87	70010947	Transistor	BC858	
TW89	70010942	Transistor	BC848	
TW92	70010949	Transistor	BC858	
TX05	70010947	Transistor	BC858	
TX11	70010142	Transistor	BC327-40	
TX12	70010150	Transistor	BC848B	
TX16	70010150	Transistor	BC848B	
TX17	70010142	Transistor	BC327-40	
TX26	70010148	Transistor	BD434	
TX27	70010150	Transistor	BC848B	
TX28	70010517	Transistor	BC369	
TX44	70010150	Transistor	BC848B	
TX45	70010943	Transistor	BC807	
TJ01	A6014040	Transistor,Chip	RN2404	
		- DIODES -		
DC45	70010342	Diode,Chip	LL4148	
DF30	70010963	Diode,Zener	ZMM9.1	
DF31	70010342	Diode,Chip	LL4148	
DF34	70010342	Diode,Chip	LL4148	
DN13	70010342	Diode,Chip	LL4148	
DN44	70010342	Diode,Chip	LL4148	
DS63	70010964	Diode,Zener	ZMM7.5	
DV55	70010342	Diode,Chip	LL4148	
DV58	70010342	Diode,Chip	LL4148	
DV69	70010965	Diode	LL4448	
DV71	70010965	Diode	LL4448	
DW26	70010153	Diode	1N4148	
DW27	70010342	Diode,Chip	LL4148	
DW30	70041093	Chip Jumper		
DW86	70010342	Diode,Chip	LL4148	
DW92	70010342	Diode,Chip	LL4148	
DW94	70010342	Diode,Chip	LL4148	
DW97	70041093	Chip Jumper		
DW98	70010342	Diode,Chip	LL4148	
DX22	70010342	Diode,Chip	LL4148	
		- COILS -		
LA32	70010489	Coil,Peaking		
LF01	70010478	Coil,Peaking		
LF02	23237985	Coil,Peaking	TRF4150AC	
LF04	70010490	Coil,Peaking		
LF08	70010478	Coil,Peaking		
LF09	23237983	Coil,Peaking	TRF4220AC	
LF11	70010493	Coil,Peaking		
LF24	23237985	Coil,Peaking	TRF4150AC	
LF32	70010490	Coil,Peaking		
LF48	23237976	Coil,Peaking	TRF4820AC	
LF49	23237972	Coil,Peaking	TRF4181AC	
LI10	70010923	Coil,Peaking		
LI16	70041096	Chip Jumper		
LN01	70011205	Coil,Peaking		
LN08	70010918	Coil,Peaking		
LN38	70010097	Coil,Peaking		
LS47	70010927	Coil,Peaking		
LS61	70010928	Coil,Peaking		
LS62	70010928	Coil,Peaking		
LV03	70010919	Coil,Peaking		
LV07	70010562	Coil,Peaking		
LV12	23237985	Coil,Peaking	TRF4150AC	
LV36	70011204	Coil,Peaking		
LV38	70010562	Coil,Peaking		
LV55	23237975	Coil,Peaking	TRF4101AC	
LV60	70010490	Coil,Peaking		
LV71	70010920	Coil,Peaking		
LW01	70011203	Coil,Peaking		
LW02	70041093	Chip Jumper		
LW06	70010917	Coil,Peaking		
LW11	70010924	Coil,Peaking		
LW16	23237999	Coil,Peaking	TRF4109AC	
LX01	70010927	Coil,Peaking		
		- CAPACITORS -		
CA01	70041030	Cap,Plastic	680NF	M 50V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CA02	70040288	Cap, Plastic	470NF	M 63V
CA03	70041003	Cap, Chip	680PF	K 50V
CA10	70041051	Cap, Electrolytic	47MF	M 16V
CA30	24815561	Cap, Chip	560PF	K 50V
CA32	70040268	Cap, Ceramic, Chip	22NF	K 25V
CA33	24815561	Cap, Chip	560PF	K 50V
CA38	24774120	Cap, Chip	12PF	J 50V
CA40	24774330	Cap, Chip	33PF	J 50V
CA41	24774390	Cap, Chip	39PF	J 50V
CA42	70040287	Cap, Plastic	100NF	M 50V
CA45	70040987	Cap, Chip	27PF	J 50V
CA55	24203101	Cap, Electrolytic	100MF	M 16V
CA81	70041051	Cap, Electrolytic	47MF	M 16V
CA82	70041006	Cap, Chip	10NF	J 50V
CC48	70040998	Cap, Chip	100NF	Z 25V
CF02	24774560	Cap, Chip	56P	J 50V
CF03	24774270	Cap, Chip	27PF	J 50V
CF06	70041007	Cap, Chip	22NF	M 25V
CF07	24630852	Cap, Electrolytic	22MF	M 16V
CF08	70040985	Cap, Chip	220PF	J 50V
CF09	24774120	Cap, Chip	12PF	J 50V
CF11	24774120	Cap, Chip	12PF	J 50V
CF13	24774151	Cap, Chip	150PF	J 50V
CF19	24815152	Cap, Chip	1500PF	K 50V
CF21	70040527	Cap, Electrolytic	4.7MF	M 16V
CF22	70040247	Cap, Ceramic, Chip	1NF	J 50V
CF23	70041006	Cap, Chip	10NF	J 50V
CF24	24774820	Cap, Chip	82PF	J 50V
CF28	70041007	Cap, Chip	22NF	M 25V
CF29	70041051	Cap, Electrolytic	47MF	M 16V
CF30	70040268	Cap, Ceramic, Chip	22NF	K 25V
CF31	24774120	Cap, Chip	12PF	J 50V
CF32	24774479	Cap, Chip	4.7PF	
CF33	24774560	Cap, Chip	56P	J 50V
CF38	70041006	Cap, Chip	10NF	J 50V
CF41	70040493	Cap, Chip	10NF	K 50V
CF43	70041108	Cap, Chip	10NF	M 50V
CF45	70040998	Cap, Chip	100NF	Z 25V
CF46	70041006	Cap, Chip	10NF	J 50V
CF47	70041103	Cap, Chip	33PF	J 50V
CF48	24774151	Cap, Chip	150PF	J 50V
CF51	24774680	Cap, Chip	68PF	J 50V
CI01	70040227	Cap, Ceramic, Chip	1NF	J 50V
CI08	70041007	Cap, Chip	22NF	M 25V
CI14	70041007	Cap, Chip	22NF	M 25V
CI16	70041007	Cap, Chip	22NF	M 25V
CI39	70041020	Cap, Chip	56PF	J 50V
CI40	70041006	Cap, Chip	10NF	J 50V
CI41	70040524	Cap, Electrolytic	22MF	X 10V
CI42	70040527	Cap, Electrolytic	4.7MF	M 16V
CI43	70040507	Cap, Plastic	470NF	J 63V
CI44	70041019	Cap, Chip	39PF	J 50V
CI45	70040287	Cap, Plastic	100NF	M 50V
CI46	70041007	Cap, Chip	22NF	M 25V
CI47	70040247	Cap, Ceramic, Chip	1NF	J 50V
CI50	24630850	Cap, Electrolytic	47MF	M 16V
CI60	70041007	Cap, Chip	22NF	M 25V
CI72	24774270	Cap, Chip	27PF	J 50V
CN01	24774680	Cap, Chip	68PF	J 50V
CN03	24630852	Cap, Electrolytic	22MF	M 16V
CN05	24774121	Cap, Chip	120PF	J 50V
CN06	70040733	Cap, Chip	560PF	J 50V
CN08	70040999	Cap, Chip	51PF	J 50V
CN09	70041055	Cap, Electrolytic	3.3MF	M 50V
CN11	70041055	Cap, Electrolytic	3.3MF	M 50V
CN12	70041109	Cap, Plastic	330NF	K 50V
CN13	70041000	Cap, Chip	220NF	Z 50V
CN17	70040985	Cap, Chip	220PF	J 50V
CN18	24783399	Cap, Chip	3.9PF	
CN22	70041007	Cap, Chip	22NF	M 25V
CN23	70040493	Cap, Chip	10NF	K 50V
CN24	70041108	Cap, Chip	10NF	M 50V
CN25	70041007	Cap, Chip	22NF	M 25V
CN32	70041104	Cap, Chip	68NF	Z 25V
CN33	70040412	Cap, Electrolytic	220MF	M 10V
CN34	70041005	Cap, Chip	6.8NF	K 50V
CN36	70041042	Cap, Electrolytic	10MF	X
CN37	24630852	Cap, Electrolytic	22MF	M 16V
CN39	70041006	Cap, Chip	10NF	J 50V
CN41	70041055	Cap, Electrolytic	3.3MF	M 50V
CN44	70041023	Cap, Chip	22NF	M 50V
CN50	70041055	Cap, Electrolytic	3.3MF	M 50V
CN51	70041041	Cap, Electrolytic	47MF	X 63V
CS01	24203101	Cap, Electrolytic	100MF	M 16V
CS39	24203100	Cap, Electrolytic	10MF	M 16V
CS40	24203100	Cap, Electrolytic	10MF	M 16V
CS42	70040981	Cap, Chip	150PF	J 50V
CS44	70041018	Cap, Chip	4.7PF	C
CS55	24774820	Cap, Chip	82PF	J 50V
CS57	24774560	Cap, Chip	56P	J 50V
CS58	70041002	Cap, Chip	680PF	J 50V
CS59	24774121	Cap, Chip	120PF	J 50V
CS61	24287473	Cap, Chip	0.047MF	Z 50V
CS62	24203100	Cap, Electrolytic	10MF	M 16V
CS63	70041006	Cap, Chip	10NF	J 50V
CS64	24203100	Cap, Electrolytic	10MF	M 16V
CV01	24092293	Cap, Chip	0.1MF	Z 25V
CV02	70041006	Cap, Chip	10NF	J 50V
CV03	70041051	Cap, Electrolytic	47MF	M 16V
CV06	70040899	Cap, Plastic	22NF	K 63V
CV07	24774680	Cap, Chip	68PF	J 50V
CV11	70041006	Cap, Chip	10NF	J 50V
CV12	70041108	Cap, Chip	10NF	M 50V
CV13	70040287	Cap, Plastic	100NF	M 50V
CV17	70040994	Cap, Chip	390PF	J 50V
CV28	70041023	Cap, Chip	22NF	M 50V
CV34	70041025	Cap, Chip	82PF	J 50V
CV35	70040723	Cap, Electrolytic	1MF	M 50V
CV36	24783829	Cap, Chip	8.2PF	
CV38	70040016	Cap, Ceramic	47PF	J 50V
CV39	70040977	Cap, Ceramic	39PF	J 50V
CV41	70041108	Cap, Chip	10NF	M 50V
CV42	70041114	Cap, Ceramic	33NF	K 50V
CV43	70040527	Cap, Electrolytic	4.7MF	M 16V
CV44	70041006	Cap, Chip	10NF	J 50V
CV46	70041019	Cap, Chip	39PF	J 50V
CV47	70041107	Cap, Chip	18PF	J 50V
CV48	24093962	Cap, Variable		
CV49	24815222	Cap, Chip	2200PF	K 50V
CV51	70040723	Cap, Electrolytic	1MF	M 50V
CV53	24774101	Cap, Chip	100PF	J 50V
CV54	70040990	Cap, Chip	12PF	J 50V
CV55	24092293	Cap, Chip	0.1MF	Z 25V
CV56	70040412	Cap, Electrolytic	220MF	M 10V
CV57	70041025	Cap, Chip	82PF	J 50V
CV58	70040995	Cap, Chip	33PF	J 50V
CV59	70041007	Cap, Chip	22NF	M 25V
CV61	70040723	Cap, Electrolytic	1MF	M 50V
CV62	70041006	Cap, Chip	10NF	J 50V
CV65	70040527	Cap, Electrolytic	4.7MF	M 16V
CV67	70041006	Cap, Chip	10NF	J 50V
CV68	70041108	Cap, Chip	10NF	M 50V
CV69	24636229	Cap, Electrolytic	2.2MF	M 50V
CV71	24203101	Cap, Electrolytic	100MF	M 16V
CV72	70040406	Cap, Plastic	220NF	M 63V
CV73	24636229	Cap, Electrolytic	2.2MF	M 50V
CV74	70041108	Cap, Chip	10NF	M 50V
CV75	70041051	Cap, Electrolytic	47MF	M 16V
CV83	70041007	Cap, Chip	22NF	M 25V
CV85	24774150	Cap, Chip	15PF	J 50V
CW01	24774101	Cap, Chip	100PF	J 50V
CW02	24774101	Cap, Chip	100PF	J 50V
CW03	24203101	Cap, Electrolytic	100MF	M 16V
CW04	70041007	Cap, Chip	22NF	M 25V
CW05	70041007	Cap, Chip	22NF	M 25V
CW06	70041012	Cap, Chip	150PF	J 50V
CW07	70040980	Cap, Chip	100PF	J 50V
CW08	70041007	Cap, Chip	22NF	M 25V
CW09	70040418	Cap, Electrolytic	47MF	M 35V
CW10	70041051	Cap, Electrolytic	47MF	M 16V

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
CW11	24203101	Cap, Electrolytic	100MF	M 16V
CW16	70040983	Cap, Chip	270PF	G 50V
CW17	70040982	Cap, Chip	820PF	J 50V
CW30	70041007	Cap, Chip	22NF	M 25V
CW33	70041007	Cap, Chip	22NF	M 25V
CW38	70041007	Cap, Chip	22NF	M 25V
CW40	24203100	Cap, Electrolytic	10MF	M 16V
CW41	70041063	Cap, Chip	330PF	J 50V
CW43	70041007	Cap, Chip	22NF	M 25V
CW44	70040269	Cap, Ceramic, Chip	47NF	Z 50V
CW45	70040723	Cap, Electrolytic	1MF	M 50V
CW47	70041051	Cap, Electrolytic	47MF	M 16V
CW51	24203101	Cap, Electrolytic	100MF	M 16V
CW52	24092293	Cap, Chip	0.1MF	Z 25V
CW55	24774680	Cap, Chip	68PF	J 50V
CW56	24630852	Cap, Electrolytic	22MF	M 16V
CW57	70040993	Cap, Chip	330PF	K 50V
CW58	70040527	Cap, Electrolytic	4.7MF	M 16V
CW61	70040993	Cap, Chip	330PF	K 50V
CW65	70041051	Cap, Electrolytic	47MF	M 16V
CW97	24203100	Cap, Electrolytic	10MF	M 16V
CW98	24203101	Cap, Electrolytic	100MF	M 16V
CX06	24203101	Cap, Electrolytic	100MF	M 16V
CX07	70040723	Cap, Electrolytic	1MF	M 50V
CX16	70040723	Cap, Electrolytic	1MF	M 50V
CJ01	70040996	Cap, Chip	1NF	K 50V
CJ02	70040723	Cap, Electrolytic	1MF	M 50V
CJ03	70041041	Cap, Electrolytic	47MF	X 63V
CJ04	70041006	Cap, Chip	10NF	J 50V
CJ05	70040723	Cap, Electrolytic	1MF	M 50V
CJ06	24815222	Cap, Chip	2200PF	K 50V
CJ07	24774101	Cap, Chip	100PF	J 50V
		- RESISTORS -		
R101	70041096	Chip Jumper		
R102	70041096	Chip Jumper		
RA01	24871394	Res, Chip	390K	J 1/8W
RA05	24871561	Res, Chip	560	J 1/8W
RA10	24872223	Res, Chip	22K	J 1/16W
RA11	24872333	Res, Chip	33K	J 1/16W
RA30	24871472	Res, Chip	4.7K	J 1/8W
RA33	24872472	Res, Chip	4.7K	J 1/16W
RA34	24871473	Res, Chip	47K	J 1/8W
RA44	70040350	Res, Chip	220	J 1/16W
RA45	24872102	Res, Chip	1K	J 1/16W
RA47	24872122	Res, Chip	1.2K	J 1/16W
RA48	70041093	Chip Jumper		
RA49	70041096	Chip Jumper		
RA60	70041096	Chip Jumper		
RA62	70041096	Chip Jumper		
RC30	70041093	Chip Jumper		
RC52	70041093	Chip Jumper		
RF02	24872222	Res, Chip	2.2K	J 1/16W
RF03	24872391	Res, Chip	390	J 1/16W
RF04	24872122	Res, Chip	1.2K	J 1/16W
RF06	24872471	Res, Chip	470	J 1/16W
RF07	24872431	Res, Chip	430	J 1/16W
RF08	24872332	Res, Chip	3.3K	J 1/16W
RF09	24871681	Res, Chip	680	J 1/8W
RF10	24871472	Res, Chip	4.7K	J 1/8W
RF11	24872471	Res, Chip	470	J 1/16W
RF12	24872182	Res, Chip	1.8K	J 1/16W
RF13	24872822	Res, Chip	8.2K	J 1/16W
RF14	24872102	Res, Chip	1K	J 1/16W
RF16	24871271	Res, Chip	270	J 1/8W
RF18	24871223	Res, Chip	22K	J 1/8W
RF24	24871561	Res, Chip	560	J 1/8W
RF26	24872681	Res, Chip	680	J 1/16W
RF30	24872102	Res, Chip	1K	J 1/16W
RF31	24872102	Res, Chip	1K	J 1/16W
RF32	24872183	Res, Chip	18K	J 1/16W
RF35	24872472	Res, Chip	4.7K	J 1/16W
RF41	24871182	Res, Chip	1.8K	J 1/8W
RF43	24872152	Res, Chip	1.5K	J 1/16W
RF45	24871271	Res, Chip	270	J 1/8W
RF46	24872473	Res, Chip	47K	J 1/16W
RF47	24872822	Res, Chip	8.2K	J 1/16W
RF48	24872182	Res, Chip	1.8K	J 1/16W
RF49	24872182	Res, Chip	1.8K	J 1/16W
RF50	24872122	Res, Chip	1.2K	J 1/16W
RF51	24871681	Res, Chip	680	J 1/8W
RF52	24872222	Res, Chip	2.2K	J 1/16W
RI05	24871560	Res, Chip	56	J 1/8W
RI06	24872222	Res, Chip	2.2K	J 1/16W
RI07	24872220	Res, Chip	22	J 1/16W
RI08	24872820	Res, Chip	82	J 1/16W
RI09	24872822	Res, Chip	8.2K	J 1/16W
RI10	24872101	Res, Chip	100	J 1/16W
RI38	70041096	Chip Jumper		
RI39	24872102	Res, Chip	1K	J 1/16W
RI40	24872153	Res, Chip	15K	J 1/16W
RI41	24871103	Res, Chip	10K	J 1/8W
RI42	24871221	Res, Chip	220	J 1/8W
RI44	24872222	Res, Chip	2.2K	J 1/16W
RI45	24872271	Res, Chip	270	J 1/16W
RI46	24872100	Res, Chip	10	J 1/16W
RI47	24872271	Res, Chip	270	J 1/16W
RI51	24871271	Res, Chip	270	J 1/8W
RI61	24872151	Res, Chip	150	J 1/16W
RN01	24871272	Res, Chip	2.7K	J 1/8W
RN02	24872152	Res, Chip	1.5K	J 1/16W
RN04	24871332	Res, Chip	3.3K	J 1/8W
RN05	24871471	Res, Chip	470	J 1/8W
RN06	24871152	Res, Chip	1.5K	J 1/8W
RN07	70041088	Res, Chip	5.6M	J
RN08	24872223	Res, Chip	22K	J 1/16W
RN10	24871101	Res, Chip	100	J 1/8W
RN11	24872471	Res, Chip	470	J 1/16W
RN13	24872333	Res, Chip	33K	J 1/16W
RN16	24872184	Res, Chip	180K	J 1/16W
RN17	24872122	Res, Chip	1.2K	J 1/16W
RN18	24872472	Res, Chip	4.7K	J 1/16W
RN20	70041096	Chip Jumper		
RN21	24872272	Res, Chip	2.7K	J 1/16W
RN22	24872822	Res, Chip	8.2K	J 1/16W
RN23	24872822	Res, Chip	8.2K	J 1/16W
RN24	24872223	Res, Chip	22K	J 1/16W
RN25	70041089	Res, Chip	8.2M	J
RN27	24872472	Res, Chip	4.7K	J 1/16W
RN28	24872822	Res, Chip	8.2K	J 1/16W
RN29	24872123	Res, Chip	12K	J 1/16W
RN32	24872822	Res, Chip	8.2K	J 1/16W
RN33	24872153	Res, Chip	15K	J 1/16W
RN34	24872224	Res, Chip	220K	J 1/16W
RN37	24871472	Res, Chip	4.7K	J 1/8W
RN38	24872273	Res, Chip	27K	J 1/16W
RN39	24872222	Res, Chip	2.2K	J 1/16W
RN57	24872102	Res, Chip	1K	J 1/16W
RN59	70040103	Res, Carbon	1K	J 1/4W
RN65	70041096	Chip Jumper		
RN78	70041096	Chip Jumper		
⚠RS02	70040124	Res, Fusible	33	J 0.3W
RS03	24872471	Res, Chip	470	J 1/16W
RS19	70040106	Res, Carbon	10K	J 1/4W
RS39	24872152	Res, Chip	1.5K	J 1/16W
RS40	24871123	Res, Chip	12K	J 1/8W
RS41	24871123	Res, Chip	12K	J 1/8W
RS42	24872331	Res, Chip	330	J 1/16W
RS43	24872152	Res, Chip	1.5K	J 1/16W
RS44	24871102	Res, Chip	1K	J 1/8W
RS45	24871220	Res, Chip	22	J 1/8W
RS51	24871474	Res, Chip	470K	J 1/8W
RS55	24872562	Res, Chip	5.6K	J 1/16W
RS58	24872823	Res, Chip	82K	J 1/16W
RS59	70040118	Res, Carbon	4.7K	J 1/4W
RS60	24872222	Res, Chip	2.2K	J 1/16W
RS63	70041067	Res, Carbon	180	J
RV01	24872102	Res, Chip	1K	J 1/16W
RV02	24872122	Res, Chip	1.2K	J 1/16W
RV03	24872471	Res, Chip	470	J 1/16W
RV05	70041093	Chip Jumper		

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RV07	24872102	Res, Chip	1K	J 1/16W
RV08	24872682	Res, Chip	6. 8K	J 1/16W
RV09	24872822	Res, Chip	8. 2K	J 1/16W
RV10	24872102	Res, Chip	1K	J 1/16W
RV11	24872471	Res, Chip	470	J 1/16W
RV13	24872302	Res, Chip	3K	J 1/16W
RV14	24872202	Res, Chip	2K	J 1/16W
RV15	70041096	Chip Jumper		
RV17	24872222	Res, Chip	2. 2K	J 1/16W
RV20	70041096	Chip Jumper		
RV22	24872101	Res, Chip	100	J 1/16W
RV25	24871561	Res, Chip	560	J 1/8W
RV26	24872332	Res, Chip	3. 3K	J 1/16W
RV27	24871681	Res, Chip	680	J 1/8W
RV28	24872471	Res, Chip	470	J 1/16W
RV31	24871472	Res, Chip	4. 7K	J 1/8W
RV32	24872223	Res, Chip	22K	J 1/16W
RV33	70040784	Res, Carbon	22K	J 1/4W
RV34	24872103	Res, Chip	10K	J 1/16W
RV35	24872223	Res, Chip	22K	J 1/16W
RV36	70040701	Res, Carbon	100	J 1/4W
RV39	24872472	Res, Chip	4. 7K	J 1/16W
RV43	24872471	Res, Chip	470	J 1/16W
RV46	24871102	Res, Chip	1K	J 1/8W
RV49	24871153	Res, Chip	15K	J 1/8W
RV50	70040961	Res, Carbon	1K	J 1/4W
RV51	24871152	Res, Chip	1. 5K	J 1/8W
RV52	24872332	Res, Chip	3. 3K	J 1/16W
RV53	70040962	Res, Carbon	47K	J 1/4W
RV54	24872473	Res, Chip	47K	J 1/16W
RV56	70041093	Chip Jumper		
RV57	70040786	Res, Carbon	33K	J 1/4W
RV58	24872222	Res, Chip	2. 2K	J 1/16W
RV60	24872332	Res, Chip	3. 3K	J 1/16W
RV61	24872103	Res, Chip	10K	J 1/16W
RV62	24872561	Res, Chip	560	J 1/16W
RV63	24872561	Res, Chip	560	J 1/16W
RV66	24871821	Res, Chip	820	J 1/8W
RV67	24871562	Res, Chip	5. 6K	J 1/8W
RV68	24871105	Res, Chip	1M	J 1/8W
RV69	24872223	Res, Chip	22K	J 1/16W
RV70	24871102	Res, Chip	1K	J 1/8W
RV71	24872223	Res, Chip	22K	J 1/16W
RV72	24871123	Res, Chip	12K	J 1/8W
RV73	24871103	Res, Chip	10K	J 1/8W
RV74	24871472	Res, Chip	4. 7K	J 1/8W
RV75	24871103	Res, Chip	10K	J 1/8W
RV77	24871105	Res, Chip	1M	J 1/8W
RV80	70041096	Chip Jumper		
RV81	70041093	Chip Jumper		
RV85	24872153	Res, Chip	15K	J 1/16W
RV87	70041069	Res, Carbon	33K	J
RV88	24871103	Res, Chip	10K	J 1/8W
RV89	24872822	Res, Chip	8. 2K	J 1/16W
RW02	70041093	Chip Jumper		
RW03	24872102	Res, Chip	1K	J 1/16W
RW04	70040103	Res, Carbon	1K	J 1/4W
RW05	24872102	Res, Chip	1K	J 1/16W
RW06	24871182	Res, Chip	1. 8K	J 1/8W
RW08	24872104	Res, Chip	100K	J 1/16W
RW10	24872103	Res, Chip	10K	J 1/16W
RW101	24872271	Res, Chip	270	J 1/16W
RW11	70041094	Res, Chip	130	J
RW12	24872221	Res, Chip	220	J 1/16W
RW13	24872681	Res, Chip	680	J 1/16W
RW14	24871272	Res, Chip	2. 7K	J 1/8W
RW15	24872221	Res, Chip	220	J 1/16W
RW16	24872331	Res, Chip	330	J 1/16W
RW17	24872103	Res, Chip	10K	J 1/16W
RW18	24872273	Res, Chip	27K	J 1/16W
RW20	24872472	Res, Chip	4. 7K	J 1/16W
RW21	70041096	Chip Jumper		
RW22	70041096	Chip Jumper		
RW24	70041096	Chip Jumper		
RW25	70041096	Chip Jumper		

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RW29	24871223	Res, Chip	22K	J 1/8W
RW30	70041096	Chip Jumper		
RW37	24871561	Res, Chip	560	J 1/8W
RW43	24871330	Res, Chip	33	J 1/8W
RW44	24871103	Res, Chip	10K	J 1/8W
RW45	24872472	Res, Chip	4. 7K	J 1/16W
RW46	24872822	Res, Chip	8. 2K	J 1/16W
RW47	24872822	Res, Chip	8. 2K	J 1/16W
RW48	24872222	Res, Chip	2. 2K	J 1/16W
RW49	24872822	Res, Chip	8. 2K	J 1/16W
RW50	24872472	Res, Chip	4. 7K	J 1/16W
⚠RW51	70040456	Res, Fusible	10	J
RW52	24871101	Res, Chip	100	J 1/8W
RW53	24871680	Res, Chip	68K	J 1/8W
RW54	24872561	Res, Chip	560	J 1/16W
RW55	24872750	Res, Chip	75	J 1/16W
RW56	24871102	Res, Chip	1K	J 1/8W
RW57	24871474	Res, Chip	470K	J 1/8W
RW58	24872224	Res, Chip	220K	J 1/16W
RW59	24871681	Res, Chip	680	J 1/8W
RW60	24872183	Res, Chip	18K	J 1/16W
RW61	24871681	Res, Chip	680	J 1/8W
RW67	24872122	Res, Chip	1. 2K	J 1/16W
RW68	70041096	Chip Jumper		
RW71	24872103	Res, Chip	10K	J 1/16W
RW72	24872123	Res, Chip	12K	J 1/16W
RW86	24872821	Res, Chip	820	J 1/16W
RW87	24872223	Res, Chip	22K	J 1/16W
RW88	24872272	Res, Chip	2. 7K	J 1/16W
RW89	24872223	Res, Chip	22K	J 1/16W
RW90	70041096	Chip Jumper		
RW92	24872153	Res, Chip	15K	J 1/16W
RW96	24872683	Res, Chip	68K	J 1/16W
RW97	70041071	Res, Carbon	3. 9	J
RX07	24872103	Res, Chip	10K	J 1/16W
RX08	24871472	Res, Chip	4. 7K	J 1/8W
RX09	24872272	Res, Chip	2. 7K	J 1/16W
RX11	24872223	Res, Chip	22K	J 1/16W
RX12	24871102	Res, Chip	1K	J 1/8W
RX15	24872272	Res, Chip	2. 7K	J 1/16W
RX16	24871103	Res, Chip	10K	J 1/8W
RX17	24871272	Res, Chip	2. 7K	J 1/8W
RX18	24871223	Res, Chip	22K	J 1/8W
RX23	24871181	Res, Chip	180	J 1/8W
RX24	24871103	Res, Chip	10K	J 1/8W
RX27	24872222	Res, Chip	2. 2K	J 1/16W
RX28	24871103	Res, Chip	10K	J 1/8W
RX30	70040118	Res, Carbon	4. 7K	J 1/4W
RX32	70041093	Chip Jumper		
RX35	70041116	Res, Fusible	39	J 0. 3W
RX41	24871123	Res, Chip	12K	J 1/8W
RX43	24871472	Res, Chip	4. 7K	J 1/8W
RX45	24872472	Res, Chip	4. 7K	J 1/16W
RX46	24872223	Res, Chip	22K	J 1/16W
RX50	24872122	Res, Chip	1. 2K	J 1/16W
RX58	70041096	Chip Jumper		
RX70	24872101	Res, Chip	100	J 1/16W
RX90	70041096	Chip Jumper		
RX91	24872272	Res, Chip	2. 7K	J 1/16W
RX93	70040106	Res, Carbon	10K	J 1/4W
J004	70041096	Chip Jumper		
J005	70041096	Chip Jumper		
J007	70041096	Chip Jumper		
J008	70041096	Chip Jumper		
J010	70041096	Chip Jumper		
J011	70041093	Chip Jumper		
J012	70041093	Chip Jumper		
J015	70041093	Chip Jumper		
J017	70041093	Chip Jumper		
J018	70041093	Chip Jumper		
J020	70041096	Chip Jumper		
J021	70041093	Chip Jumper		
J023	70041093	Chip Jumper		
J024	70041093	Chip Jumper		
J025	70041093	Chip Jumper		

LOCATION NUMBER	PART NUMBER	DESCRIPTION
J026	70041093	Chip Jumper
J027	70041093	Chip Jumper
J030	70041093	Chip Jumper
J035	70041093	Chip Jumper
J038	70041093	Chip Jumper
J039	70041093	Chip Jumper
J040	70041096	Chip Jumper
J043	70041093	Chip Jumper
J045	70041093	Chip Jumper
J048	70041093	Chip Jumper
J050	70041093	Chip Jumper
J052	70041096	Chip Jumper
J053	70041096	Chip Jumper
J054	70041096	Chip Jumper
J055	70041093	Chip Jumper
J056	70041096	Chip Jumper
J057	70041093	Chip Jumper
J058	70041096	Chip Jumper
J059	70041093	Chip Jumper
J060	70041093	Chip Jumper
J062	70041096	Chip Jumper
J063	70041096	Chip Jumper
J065	70041096	Chip Jumper
J066	70041096	Chip Jumper
J069	70041093	Chip Jumper
J070	70041093	Chip Jumper
J073	70041096	Chip Jumper
J074	70041093	Chip Jumper
J075	70041093	Chip Jumper
J076	70041093	Chip Jumper
J077	70041093	Chip Jumper
J078	70041096	Chip Jumper
J079	70041093	Chip Jumper
J081	70041096	Chip Jumper
J083	70041093	Chip Jumper
J084	70041093	Chip Jumper
J086	70041093	Chip Jumper
J087	70041096	Chip Jumper
J089	70041093	Chip Jumper
J090	70041093	Chip Jumper
J091	70041093	Chip Jumper
J092	70041096	Chip Jumper
J093	70041093	Chip Jumper
J095	70041093	Chip Jumper
J096	70041093	Chip Jumper
J097	70041096	Chip Jumper
J098	70041093	Chip Jumper
J100	70041093	Chip Jumper
J101	70041093	Chip Jumper
J102	70041093	Chip Jumper
J103	70041093	Chip Jumper
J104	70041096	Chip Jumper
J105	70041093	Chip Jumper
J106	70041093	Chip Jumper
J107	70041093	Chip Jumper
J110	70041093	Chip Jumper
J114	70041093	Chip Jumper
J115	70041093	Chip Jumper
J116	70041093	Chip Jumper
J117	70041093	Chip Jumper
J118	70041093	Chip Jumper
J120	70041093	Chip Jumper
J124	70041093	Chip Jumper
J125	70041096	Chip Jumper
J127	70041096	Chip Jumper
J128	70041093	Chip Jumper
J130	70041093	Chip Jumper
J131	70041093	Chip Jumper
J133	70041096	Chip Jumper
J134	70041093	Chip Jumper
J139	70041093	Chip Jumper
J140	70041093	Chip Jumper
J143	70041093	Chip Jumper
J144	70041093	Chip Jumper
J150	70041096	Chip Jumper

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
J153	70041093	Chip Jumper		
J156	70041096	Chip Jumper		
J158	70041093	Chip Jumper		
J159	70041093	Chip Jumper		
J160	70041096	Chip Jumper		
J170	70041096	Chip Jumper		
J180	70041093	Chip Jumper		
J182	70041093	Chip Jumper		
J183	70041093	Chip Jumper		
J201	70041093	Chip Jumper		
J202	70041093	Chip Jumper		
J203	70041093	Chip Jumper		
J204	70041093	Chip Jumper		
J205	70041096	Chip Jumper		
J207	70041096	Chip Jumper		
J218	70041096	Chip Jumper		
J220	70041093	Chip Jumper		
J221	70041093	Chip Jumper		
J256	70041096	Chip Jumper		
J271	70041093	Chip Jumper		
J354	70041096	Chip Jumper		
J370	70041093	Chip Jumper		
J384	70041093	Chip Jumper		
J417	70041093	Chip Jumper		
J427	70041093	Chip Jumper		
J434	70041093	Chip Jumper		
J456	70041096	Chip Jumper		
J461	70041096	Chip Jumper		
J472	70041093	Chip Jumper		
J473	70041093	Chip Jumper		
J476	70041096	Chip Jumper		
J481	70041093	Chip Jumper		
J485	70041093	Chip Jumper		
J489	70041093	Chip Jumper		
J495	70041096	Chip Jumper		
J496	70041096	Chip Jumper		
JI01	70041093	Chip Jumper		
JI05	70041096	Chip Jumper		
JI06	70041096	Chip Jumper		
JI07	70041096	Chip Jumper		
JI10	70041093	Chip Jumper		
JI11	70041096	Chip Jumper		
JI12	70041093	Chip Jumper		
JI13	70041096	Chip Jumper		
JI14	70041093	Chip Jumper		
JI15	70041096	Chip Jumper		
PA44	24066739	Res, Variable	10K	
PF01	24066736	Res, Variable	1K	
PF33	24066736	Res, Variable	1K	
PF41	24066736	Res, Variable	1K	
PI40	24066739	Res, Variable	10K	
PN19	70040803	Res, Variable	2. 2K	
PN21	70040219	Res, Variable	3K	
PN24	24066739	Res, Variable	10K	
PN39	70040218	Res, Variable	22K	
PN44	24066739	Res, Variable	10K	
PS40	24066736	Res, Variable	1K	
PV57	70040803	Res, Variable	2. 2K	
CI07	70041096	Chip Jumper		
CV14	70041093	Chip Jumper		
CV24	70041093	Chip Jumper		
RJ01	24872331	Res, Chip	330	J 1/16W
RJ02	24872474	Res, Chip	470K	J 1/16W
RJ03	24871103	Res, Chip	10K	J 1/8W
RJ05	70041080	Res, Metal	130K	F
RJ06	24872103	Res, Chip	10K	J 1/16W
RJ07	24872473	Res, Chip	47K	J 1/16W
		- MISCELLANEOUS -		
0005	70010910	Tuner/Modulator Unit		
0006	70010911	F. U.	IF	
0009	70090186	PLL Sub Unit		
FI44	70010647	Filter		
FI45	70010933	Filter		
FN59	70010124	LPF		
FV01	70010938	Filter		

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
FV10	70010444	Filter	
FW03	70010321	Filter	
FW37	70010931	Filter	5.5MHz
FW39	70010930	Filter	5.5MHz
QA40	70010935	Crystal	
QV46	70010936	Crystal	
QW10	70010932	Filter	5.74MHz

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
		DIFFERENCE LIST		
V312G				
■0220	70090203	P C Board Assy	Key Display	
		- DIODES -		
DK03	--------	Not Used		
DK06	70010342	Diode, Chip	LL4148	
		- CAPACITORS -		
CK09	70041051	Cap, Electrolytic	47MF	M 16V
■0250	70090200	P C Board Assy	Main	
		- INTEGRATED CIRCUITS -		
II40	--------	Not Used		
IW31	70011212	IC	SDA5642X	
		- TRANSISTORS -		
TS57	70010150	Transistor	BC848B	
		- DIODES -		
DI57	70041093	Chip Jumper		
		- COILS -		
LI16	--------	Not Used		
LS54	70010926	Filter	4.43MHz	
LS55	70010926	Filter	4.43MHz	
LV63	70010493	Coil, Peaking		
LW31	70010097	Coil, Peaking		
		- CAPACITORS -		
CI35	70040247	Cap, Ceramic, Chip	1NF	J 50V
CI39	--------	Not Used		
CI48	70040247	Cap, Ceramic, Chip	1NF	J 50V
CI52	70041007	Cap, Chip	22NF	M 25V
CI53	24203100	Cap, Electrolytic	10MF	M 16V
CI54	24774470	Cap, Chip	47PF	J 50V
CI55	70040527	Cap, Electrolytic	4.7MF	M 16V
CI62	24630850	Cap, Electrolytic	47MF	M 16V
CS54	24774820	Cap, Chip	82PF	J 50V
CS55	70041106	Cap, Chip	82PF	K 50V
CV05	70040537	Cap, Ceramic	100PF	J 50V
CV08	24353470	Cap, Ceramic	47PF	J 50V
CV63	24436391	Cap, Ceramic	390PF	J 50V
CW17	70041122	Cap, Chip	820PF	J 50V
CW31	70041051	Cap, Electrolytic	47MF	M 16V
CW32	70041006	Cap, Chip	10NF	J 50V
CW34	70041115	Cap, Chip	150PF	K 50V
CW35	70040730	Cap, Chip	100NF	M 25V
CW36	70041102	Cap, Chip	33NF	M 50V
CW57	24287822	Cap, Chip	8.2NF	Z 50V
		- RESISTORS -		
RI39	--------	Not Used		
RI48	24872101	Res, Chip	100	J 1/16W
RI52	24871100	Res, Chip	10	J 1/8W
RI53	24872103	Res, Chip	10K	J 1/16W
RS54	24872562	Res, Chip	5.6K	J 1/16W
RS57	24871103	Res, Chip	10K	J 1/8W
RW15	24872391	Res, Chip	390	J 1/16W
RW19	24872221	Res, Chip	220	J 1/16W
RW31	24872824	Res, Chip	820K	J 1/16W
RW32	24872101	Res, Chip	100	J 1/16W
RW33	24871105	Res, Chip	1M	J 1/8W
RW34	24872104	Res, Chip	100K	J 1/16W
RW35	24872512	Res, Chip	5.1K	J 1/16W
RW36	24872824	Res, Chip	820K	J 1/16W
RW38	24872221	Res, Chip	220	J 1/16W
RW39	24872222	Res, Chip	2.2K	J 1/16W
RW42	24871561	Res, Chip	560	J 1/8W
J014	70041093	Chip Jumper		
J017	--------	Not Used		
J030	--------	Not Used		
J113	70041093	Chip Jumper		
J177	70041096	Chip Jumper		
J181	70041093	Chip Jumper		
JI16	70041096	Chip Jumper		
PI40	70040217	Res, Variable	4K	
CI57	70041096	Chip Jumper		
		- MISCELLANEOUS -		
0006	--------	Not Used		
FI44	70011226	Filter	38.9MHz	
FI45	70011208	Filter		

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
FI50	70011226	Filter	38.9MHz	
FI55	70011210	Filter		
FW38	70010507	Filter	6.5KHz	
FW40	70011206	Filter	6.5MHz	
V322GS				
■0220	70090204	P C Board Assy	Key Display	
		- DIODES -		
DK06	70010342	Diode, Chip	LL4148	
		- CAPACITORS -		
CK09	70041051	Cap, Electrolytic	47MF	M 16V
■0250	70090200	P C Board Assy	Main	
		- INTEGRATED CIRCUITS -		
II40	--------	Not Used		
IW31	70011212	IC	SDA5642X	
		- TRANSISTORS -		
TS57	70010150	Transistor	BC848B	
		- DIODES -		
DI57	70041093	Chip Jumper		
		- COILS -		
LI16	--------	Not Used		
LS54	70010926	Filter	4.43MHz	
LS55	70010926	Filter	4.43MHz	
LV63	70010493	Coil, Peaking		
LW31	70010097	Coil, Peaking		
		- CAPACITORS -		
CI35	70040247	Cap, Ceramic, Chip	1NF	J 50V
CI39	--------	Not Used		
CI48	70040247	Cap, Ceramic, Chip	1NF	J 50V
CI52	70041007	Cap, Chip	22NF	M 25V
CI53	24203100	Cap, Electrolytic	10MF	M 16V
CI54	24774470	Cap, Chip	47PF	J 50V
CI55	70040527	Cap, Electrolytic	4.7MF	M 16V
CI62	24630850	Cap, Electrolytic	47MF	M 16V
CS54	24774820	Cap, Chip	82PF	J 50V
CS55	70041106	Cap, Chip	82PF	K 50V
CV05	70040537	Cap, Ceramic	100PF	J 50V
CV08	24353470	Cap, Ceramic	47PF	J 50V
CV63	24436391	Cap, Ceramic	390PF	J 50V
CW17	70041122	Cap, Chip	820PF	J 50V
CW31	70041051	Cap, Electrolytic	47MF	M 16V
CW32	70041006	Cap, Chip	10NF	J 50V
CW34	70041115	Cap, Chip	150PF	K 50V
CW35	70040730	Cap, Chip	100NF	M 25V
CW36	70041102	Cap, Chip	33NF	M 50V
CW57	24287822	Cap, Chip	8.2NF	Z 50V
		- RESISTORS -		
RI39	--------	Not Used		
RI48	24872101	Res, Chip	100	J 1/16W
RI52	24871100	Res, Chip	10	J 1/8W
RI53	24872103	Res, Chip	10K	J 1/16W
RS54	24872562	Res, Chip	5.6K	J 1/16W
RS57	24871103	Res, Chip	10K	J 1/8W
RW15	24872391	Res, Chip	390	J 1/16W
RW19	24872221	Res, Chip	220	J 1/16W
RW31	24872824	Res, Chip	820K	J 1/16W
RW32	24872101	Res, Chip	100	J 1/16W
RW33	24871105	Res, Chip	1M	J 1/8W
RW34	24872104	Res, Chip	100K	J 1/16W
RW35	24872512	Res, Chip	5.1K	J 1/16W
RW36	24872824	Res, Chip	820K	J 1/16W
RW38	24872221	Res, Chip	220	J 1/16W
RW39	24872222	Res, Chip	2.2K	J 1/16W
RW42	24871561	Res, Chip	560	J 1/8W
J014	70041093	Chip Jumper		
J017	--------	Not Used		
J030	--------	Not Used		
J113	70041093	Chip Jumper		
J177	70041096	Chip Jumper		
J181	70041093	Chip Jumper		
JI16	70041096	Chip Jumper		
PI40	70040217	Res, Variable	4K	
CI57	70041096	Chip Jumper		
		- MISCELLANEOUS -		

LOCATION NUMBER	PART NUMBER	DESCRIPTION	
0006	--------	Not Used	
FI44	70011226	Filter	38.9MHz
FI45	70011208	Filter	
FI50	70011226	Filter	38.9MHz
FI55	70011210	Filter	
FW38	70010507	Filter	6.5KHz
FW40	70011206	Filter	6.5MHz